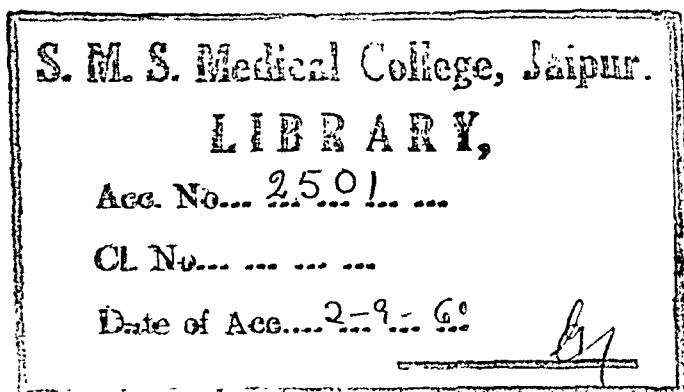


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Occupational Medicine and Hygiene Its Rôle in Britain in Wartime*

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BEFORE I tell you of our experiences since the war broke out, of our problems and our efforts, I should I think speak of the pre-war structure on which we have had to build.

The home of the factory worker and the place where he works are entirely different worlds; the purpose of the one is to serve his individual family, that of the other to serve the needs of industrial processes. This variance of function and environment imports a host of special risks to health and safety, which differ in each occupation and in each factory and are different from those encountered when not at work. Communities, therefore, have had to devise special methods of coping with these occupational problems. In Great Britain, the duty of initiating and enforcing minimum standards of health and safety in factories and mines and in some other occupations is the responsibility of the Central Government. The duty of installing and

maintaining these minimum standards is obviously for those who work therein, that is to say, both employer and the worker.

Progress in the prevention of occupational hazards in Great Britain, therefore, is the result of team work. The broad pattern we see is the Central Government, employers, and workers, with their various associations and teams of experts, all working by different routes toward a common goal. Over all, the community as a whole holds a watching brief, which keeps everybody on his toes. This self-responsibility of each section is keenly felt and definitely appreciated, and is the result of the enforcement by law of minimum standards throughout the country.

This does not mean that the conditions in every factory, for example, are alike and that the best is the same as the worst; far from it, a proportion of the factories are constantly being jolted into a proper appreciation of their obligations, but many, and I think I may say the majority of factories, aim at a higher standard and attain it. This un-

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doubtedly produces a competition of good will, and ultimately the legal minimum standards are raised by general agreement.

One has only to compare the minimum standards of the Factory and Workshop Act, 1901, with those of the Factories Act, 1937, to appreciate the outstanding advances made in the intervening years in this way. This latter Act also, after very full debate in Parliament, gave to the Minister from time to time great powers to raise standards and accelerate progress when fact and reason require it. Without the basis of law there can be no order and without order, no progress.

The permanent Departments of the Central Government dealing with health, safety, and welfare in factories and in mines and quarries respectively, are the Factory Department of the Ministry of Labour and National Service and the Ministry of Fuel and Power. The executive powers are exercised by H.M. Chief Inspector of Factories and H.M. Chief Inspector of Mines respectively. They are assisted by deputy chief inspectors, superintending inspectors (for divisions), and district inspectors with junior inspectors (for the ultimate subdivisions of the country), together with a number of specialist inspectors with special medical, electrical, engineering, physical, and chemical, etc., qualifications.

The term "H.M. Inspector of Factories" is over a hundred years old and much valued by the Inspectorate: yet sometimes it misleads visitors by suggesting that our job is analogous to that of a policeman. Of course, we have to maintain legal standards, but that is only one of many duties. Nowadays to inspect is to look and to inquire and, having looked and enquired, to *aid*—and this applies to both sides, employers and workers alike.

The Minister of Labour and National Service, Mr. Ernest Bevin, clearly described, last July in Parliament, the

position of the Factory Department in the social services of the country. He referred to its duty of carrying on a great educational work for the safety of the people in industry and its great contribution to the health of our industrial population. He went on, "I think no Department of State has a better record of work for well over a century than this Department can claim. . . . The Factory Department developed a tradition which was twofold and which, I think, in the general administration of industrial legislation, has set a standard in dealing with these problems the like of which does not exist in any other country. It can be described as persuasion with sanctions in the background. This has resulted in giving flexibility for innovations and opportunities for change that one cannot always embody either in regulations or in law."

To you I can perhaps best describe our functions in industry as not so much those of the police, but more like those of a catalyst.

That we must function in some such way is the more obvious when I mention that before the war there were over 280,000 concerns of one sort or another registered under the Factories Act. This number has much increased since, and yet our Chief Inspector, Sir Wilfrid Garrett, has only a total staff of 372 inspectors, at this moment. We can scarcely be accused of surrender to "bureaucracy" here.

You will ask, I think, "how is it possible to cater for all these factories with an Inspectorate of this size?" There is no doubt at all that more work and better inspection could be done with a larger staff, but the gap in peace time between partial achievement and full effectiveness is not perhaps so great as the figures suggest. In the first place the work is compelling in its fascination, and consequently the average weekly output of work per inspector is undoubtedly high.

Secondly, the century old acquaintanceship of industry and the department has ripened into an understanding friendship, and so all sections of industry consciously and materially aid the department's work.

Thirdly, industry on the whole knows quite well those minimum legal standards I have mentioned—they are posted in every factory—and they take considerable pains to comply with them, for employers know that it will not be long before the Inspector for the District hears of any material departure from them. Moreover, if a works acquires a bad reputation in the district and in the local magistrate's court, it takes a lot of living down. Although the fine imposed by the court may be of no account to the firm, the effects of a conviction for a breach of the Factories Act may be profound; certainly in some parts of the country the stigma of having to appear in court to answer a charge is a definite deterrent to wilful negligence. The press too is an extremely valuable aid. Again both the court and the Minister have sweeping powers for dealing with really urgent and bad conditions.

Lastly, because the department is small in number, inspectors know each other personally and the special knowledge and experience of each of his colleagues, and thus the knowledge and experience of the whole department is readily and quickly available for a single firm. Every month the Chief Inspector sends to each inspector, senior and junior alike, his "Monthly Circular," a confidential document which gives the stop-press news on matters of importance—and as it also contains notices of any promotions or transfers, it does not escape careful examination and indexing!

A defect, which I think should be remedied, is that the department has no abstracting bureau of its own. It is true that a number of journals and societies of standing at home and abroad such as the *Journal of Industrial Hygiene*, The

Bulletin of Hygiene, The *Analyst*, The Association of British Chemical Manufacturers, and the Chemical Society, to mention only a few, issue abstracts either privately or publicly, but abstracting for the needs of a particular service, be it public or private, is, as you will agree I am sure, a skilled and delicate business, best done by the particular concern itself, or matters of serious importance to the service will be overlooked.

I should have explained that the term "factory" in the Factories Act has a very wide application. It includes practically all manufacturing establishments, whether they belong to the Crown, municipalities, public corporations, or to private people: as soon as people are employed in building it, working it or pulling it down, the Factory Inspector has duties—he is both accoucheur and mortician, and some employers have rather unkindly suggested that the inspectors' talents lie in the latter direction! It includes warehouses, docks, quays, many work of engineering construction such as tunnels, reservoirs, bridges, camps, and aerodromes. It includes shipbuilding and repairing of ships, whether the vessel is in dry dock, wet dock, or tied up alongside, and also places where sorting, washing, and breaking down of articles by way of trade or for gain is carried on. Do not for a moment think we do all the work—we do not. The strength of the department lies in its legal authority and in the responsibility placed upon the individual inspectors in charge of the 92 districts, as Sir Wilfrid Garrett would be the first to suggest.

The district inspector, a well qualified and experienced man or woman, is the primary, personal, and sensitive anastomosis between industry and the department constantly carrying material between the two structures. The function of the remaining portion of the departmental organization is to nourish and

sustain this living link. To do so it draws upon its own considerable resources, on other government departments, on employers associations, and on trades unions. In turn these draw upon individuals, upon professional, technical, scientific, and legal experts, and in this way the needs of the situation are met. Among these external aids is the Department of the Government Chemist, ready and willing to undertake essential, urgent, and delicate determinations on which often so much depends. Then there is the Medical Research Council with its numerous sections. Two of these sections, the Industrial Health Research Board and the Industrial Pulmonary Diseases Committee are concerned solely with problems of health and hygiene in relation to occupation, and others like the Tuberculosis Committee, deal with subjects on which occupation has an intimate bearing.

The Department of Scientific and Industrial Research, which includes the National Physical Laboratory and the Food Investigation Department, are important sources of information. With the Ministry of Health, whose Chief Medical Officer, Sir Wilson Jameson, had the privilege of addressing you at your Conference last year, we work in the closest possible relationship.

The Local Authorities, corresponding roughly with those of your towns and cities—with their Medical Officers of Health, who have some duties of a general character, not relating specifically to occupation in factories—also give valuable help.

Close contact with the Trades Union Congress and its constituent trades unions, and equally with the many employers associations of particular industries, such as the Engineering and Allied Employers Federation and the Association of British Chemical Manufacturers, is essential for the complete functioning of the department. There are also other important independent bodies, such as

the Royal Society for the Prevention of Accidents, The Industrial Welfare Society, The Royal College of Nursing, and the Association of Industrial Medical Officers, some or all of whose activities are related to the subject we are discussing.

A unique aid to progress is provided by the activities of the Joint Industrial Councils for the various industries. These are composed of representatives of employers and workers, and the oldest is the National Council for the Pottery Industry. Among other great achievements, this Council, with the assistance of the department, succeeded in abolishing the main risk of silicosis in the china section of the industry by substituting alumina for powdered flint for bedding the ware.

Last, but not least, are the Examining Surgeons, formerly called Certifying Surgeons. There are 1,700 of these members of the medical profession distributed throughout the country, most of them engaged in the general practice of their profession.

They are appointed to carry out particular duties under the Factories Act and the Workmen's Compensation Act, under the general control of the Factory Department. Their office is of considerable antiquity, nearly as old as that of Inspector of Factories.

You will see now, I hope, how the small factory department works, and why I have suggested that it functions as a catalyst. It observes, accepts, and collects basic facts from industry and elsewhere which have any bearing on health, safety, and welfare, assesses their value and importance, makes inquiries and investigation, and, when its own knowledge and experience do not suffice, submits special points of difficulty to experts competent to deal with them.

Its specialist inspectors are in close touch with all the institutions and persons especially concerned with their particular problems and frequently get

advice from them. Other problems are settled by small committees of experts set up to advise the Chief Inspector; in this way the department keeps in close touch with outside opinion and is able to draw on wider sources of knowledge than could be supplied by any official research institution. The field work of actual research is often carried out by its own inspectors, and through them a solution is often reached; but if the subject proves too big it is handed over to outside bodies to carry through the full examination of the problem. It considers its findings with the twofold object of providing the solution to the problem and determining the most practical and feasible application to industry of any remedial measures required, and then returns the results and the department's recommendations to industry. At the same time it enforces the practical minimum legal standards in these matters. But beyond all, the inspector must be impartial and keep inviolate the many secrets and confidences entrusted to him.

And so, I think you will agree that the Inspector of Factories has a happy, friendly, and fascinating, if exacting job.

EFFECTS OF THE WAR

I think history will stress two factors as having a preponderating influence in shaping our war effort. One is the disparity between Germany's population and our own, and the other is the unpleasant proximity of enemy activity to much of our daily life. The country, therefore, has to insure that every man, woman, and young person contributes his utmost to the common aim, and that his individual effort is so applied and distributed as to minimize the effects of possible enemy action. The Government steadfastly implements this decision, and the resulting upheaval in the life of the individual has to be experienced to be appreciated.

Mr. Ernest Bevin, the Minister of

Labour and National Service, is, of course, charged with the mobilization and use of our man power in the widest sense and never for one moment has the requirement of labor and national service for everyone been forgotten.

As he explained to Parliament, it was obvious that there would be many problems of an industrial character not entirely new, but certainly more comprehensive, that would have to be dealt with as the war proceeded. In consequence, the Factory Department was transferred from the Home Office to the Ministry of Labour and National Service in June, 1940, to facilitate this work since, as the Minister explained,

... the transfer gave to the Ministry of Labour in its development of the other schemes associated with the mobilisation of man power, valuable experience, long tradition, great knowledge of the factories in the Country and contacts which served a double purpose. . . . Therefore, in the first instances, its great value was that it gave us a broader foundation on which to build and at the same time placed valuable experience readily at our disposal.

Thus, many new duties were cast upon the inspectorate. Apart from the inspectors seconded for special purposes such as research, camouflage, lighting, efficiency of blackout, and prevention of explosion, duties in connection with the development of communal feeding in factories, the provision of air-raid shelters, securing the training of factory personnel in first aid, fire fighting and anti-gas measures and the installation of the necessary equipment became part of their daily activities. Schemes for fire watching and fire fighting, welfare arrangements within the factory, measures for the education of new and untrained labor in self-protection, aiding in the concentration of nonessential industries and in the collection and transfer of redundant labor, all caused much additional work. In addition, the vast building schemes for camps, aerodromes, and factories, often far removed from

towns and essential services, became the particular charge of a section of the department.

It was also recognized by Mr. Bevin that the war would introduce another series of problems that would militate against the war effort—the troubles outside the factory, troubles due to traveling in the blackout with restricted transport facilities, troubles of shopping that bear particularly on the housewife doing the double job of running a home and working in a factory, troubles of transfer to new areas and consequent billeting on private families or in hostels, troubles of continuing to keep at work while the home is bombed and the family spends the night in shelters. In fact, it may be said that in the first year of the war these outside troubles put a greater strain on the workers than the strain of additional hours, blackout, etc., inside the factory. To deal with these troubles Mr. Bevin appointed a number of welfare officers located in all the centers of industry, who, because they dealt with the problems outside the factory, have become known as “outside” welfare officers. The work done by these officers has done much to smooth the way toward the war effort that we have now reached.

The inspectorate solved a multitude of day-to-day problems and materially facilitated quick readjustment following on the upheaval, expansion and redistribution of the industrial man power of the country. It will be observed, however, that all these activities are directed to securing the safety, health, and welfare of the industrial population. At the same time, the other bodies already mentioned whose work is complementary to that of the department have also had to expand and adjust their activities to the new conditions. Thus, the Industrial Health Research Board was reconstituted to bring it closer to the needs of the war situation. Dr. J. C. Bridge, the Senior Medical Inspector of Factories,

was appointed to the board, and another of my colleagues, Dr. R. S. F. Schilling, seconded as Secretary, and Professor A. W. H. Ellis has been appointed to the new post of Director of Research in Industrial Medicine.

The board issued several emergency reports and has numerous investigations in hand directed to determining data of essential importance for the more accurate approximation of the human machine to the national effort. The Industrial Pulmonary Diseases Committee, of the Medical Research Council, whose Secretary, Dr. E. L. Middleton, is another of my colleagues, has recently completed its investigation into chronic pulmonary disease in South Wales coal miners, and the council has published Volume 1 of its report. The report correlates x-ray appearances in the lungs with certain characteristic pathological changes not hitherto described. A second volume containing a further series of research reports on the subject is to be published shortly. An extensive program of research on the effects of exposure to TNT was initiated by the Medical Research Council and is being actively carried out. Another report of the Medical Research Council of importance to the subject of our discussion which has just been published, is the *Interim Report of the Committee on Tuberculosis in War-Time*.

The Minister of Fuel and Power also has accelerated progress of new measures for securing the health and welfare of miners, particularly in connection with the employment of juveniles and female workers and in the protection of workers against dangerous dust. Regarding protection against dangerous dust, a new code of Special Rules for Slate Miners has come into force this year, and a Code of Regulations for the Prevention and Suppression of Noxious Dust in Coal Mines is under consideration and is expected to be put into force in the near future. Extension of schemes

for rehabilitation of miners is also fore-shadowed, as also is a considerable increase in the Medical Department of the Ministry.

The Ministry of Supply, a ministry set up wholly for war purposes, is now the largest single employer of labor in the country. It has Royal Ordnance Factories, most of which are new factories which have had to be staffed by labor at first mostly inexperienced. This involved the Medical Department of the Ministry in much planning of preventive measures against occupational diseases, particularly those associated with the manufacturing and handling of explosives, such as toxic jaundice, dermatitis, and other slighter manifestations of exposure to TNT, and disturbances of health due to other types of explosives. Consequently the Ministry has had to set up large medical and nursing services for the supervision of workers employed in the Royal Ordnance Factories. In addition the provisions of hostels and welfare arrangements in these factories, often isolated; billeting; special means of transport to and from work, and numerous matters of welfare generally have been dealt with by the Ministry of Labour; the provision of special rest centers where workers can obtain a holiday in pleasant surroundings away from their dangerous work, is being explored.

Now, some observations on the difficulties of the Factory Department and the measures we have taken may be of interest to you.

First of all we have endeavored to maintain in every factory those minimum legal standards of health, welfare, and safety to which I have referred. This has often been a difficult matter because of the immense dilution of the ¹⁰⁻substituted trained and experienced staffs duties upon in order to permit of the special measures of production. Unfortunately the ¹⁰⁻important general factors a pioneer for many years are: the effects of and had a nucleus

overwork, overstrain and too long hours of employment, extension of employment of women in substitution for men, changes in the age distribution of workers, and infestation by lice and scabies and the possibility of epidemics. More important special factors are the incidence of dermatitis, of cases of gassing, and of poisoning.

EFFECTS OF BLACKOUT

This seems to be the most important single adverse factor, with the possible exception of transport difficulties. At the outbreak of war there had to be an immediate imposition of a complete blackout—this had two main effects—first, it interfered greatly with the ordinary natural ventilation of factories, gave greater opportunities for the spread of respiratory infections, and the stuffy atmosphere depressed the human machine. Second, the restriction in natural ventilation definitely caused accumulation of fume in some processes with resulting increase in cases of gassing. Many cases of gassing would never have occurred but for the damping back of fume by emergency methods of preventing glare. You can imagine how difficult it was to black out, for example, bessemer plants and coke ovens, and yet not interfere with the egress of the vast volumes of gas and fume evolved in some of these processes. Further consequences of the blackout and restriction in general ventilation were in some processes a great increase in the temperature to which the workers were exposed: this, together with the lack of air movement, obviously may quickly cause a serious situation.

Better methods of blackout were devised which incorporated light traps and yet permitted greatly improved ventilation. Extended use was made of mechanical methods of ventilation and of air movement and, although I do not suggest that conditions are yet perfect, the major part of this work has been

completed and conditions correspondingly improved.

In some factories emergency methods of obtaining blackout resulted in the work having to be carried out continuously in artificial light. While no evidence of any definite injury to health was found to result from this, it is obvious that a permanent blackout of this character has psychological effects of a depressing character. Steps have therefore been taken to restore natural lighting in daytime wherever possible.

The blackout has undoubtedly been a very important factor in increasing accidents both on the roads and also in particular occupations, for example among dock workers.

EFFECTS OF ENEMY ACTION

These include of course direct injury to workers by enemy attack, mental strain and physical discomfort, disturbance of gas, water, electric supply and transport services, loss of sleep, and irregular food supply. Such effects of enemy action do, of course, definitely slow down production, or under certain conditions stop it temporarily. The most long continued bombing was directed against the London area and people got weary of it, not so much because of the danger, but because of the attendant hardships experienced, including lack of sleep and the very much longer daily effort required to carry out normal duties.

My own view at the end of the winter 1940-1941 was that the Germans would have had to continue their nightly raiding of London for very many more months before they could have succeeded in doing more than partly depressing industrial output in this area. The Londoners stood the winter, dislocation of heating, lighting, transport, and food services well, and with the advent of the longer days and warmer weather nothing the enemy could have done in the way of continued bombing

could have nullified this natural relief. The speed with which bombed factories were got going again was a revelation—production being restarted often within a few hours under tarpaulins.

The tube or subway system of London provided good additional shelters which were dry and warm and a good asset in maintaining individual resistance, although in the earlier stages, before sleeping accommodation, medical supervision, feeding arrangements, and means for quick washing and disinfection of bedding were inaugurated, there were opportunities for the spread of infectious disease and of lice and scabies. However, as it was, in the bombed areas throughout the country after that winter, the people felt like veterans, and experience dispelled the fears of the imagination.

INFESTATION BY LICE AND SCABIES

There has undoubtedly been a great spread of scabies and infestation by lice among the population, but energetic measures on the standard lines and a new order of the Minister of Health, gave the additional powers required by local authorities to deal with the matter. Obviously, lice and scabies are continuing problems in the present circumstances, and continuing energetic measures are required to keep them within bounds. Scabies is not a disease which one can afford to neglect, because of its power of depriving affected workers of their sleep.

With lice, however, the possibility of typhus being introduced into the population has always been the concern of the Ministry of Health. So far, Sir Wilson Jameson told me the other day, there has not been a single case of typhus in the country.

HOURS OF EMPLOYMENT AND OVERSTRESS

Overstrain is an important
factor of war and parti

country has not geared itself up for war in times of peace. A warship has its maximum speed and also its "economical" speed and it is the economical speed which gives its maximum radius of action. So it is with the human machine; its economical speed gives the highest total output over a considerable period of time, but if the human machine is overstrained, the accident rate goes up greatly and faulty workmanship increases also. The elementary principles so well proved in the past tended to be lost sight of and had to be re-emphasized. On the whole, however, it was the vicissitudes of war which necessitated at certain times during the past three years an increase of speed beyond the economical in order to make good the losses. The nation certainly geared itself up after Dunkirk to an unprecedented output which served the pressing necessities, but the inevitable reaction followed, and it is clear again now that the optimum is a $5\frac{1}{2}$ day week with 1 day off and 1 short day. There is then a reserve, which if the necessity arises will permit of temporary spurts to meet vital needs—and there are still vital needs.

The Factories Act lays down limits of hours for all protected persons, that is to say, women and young persons of both sexes between the ages of 14–16 and 16–18 and these have been slightly extended by emergency powers.

The extension to which my country has gone in this respect may be of interest. Briefly, it is as follows: Young persons between 14 and 16 have had their hours extended from 44 to 48 per week, women and young persons from 16–18 of both sexes can have their ~~hours~~ increased by order of the Minister, substitute bottle necked occupations duties upon ~~tr~~-week have been worked; special measures the hours of these ~~pro~~ fortunately the ~~de~~verage about 54 to 56. a pioneer for many male young persons and had a nucleus allowed to work at

night, but no girl under 18 and no boy under 16 is employed at night. The total hours of employment per week is, however, not a complete solution, there are so many other factors which cause overstrain in wartime. Long periods of traveling to and from work under uncomfortable conditions, lack of sufficient sleep, personal anxiety, shopping difficulties, and many other factors have to be considered. The nature of the work itself, degree of experience and individual capacity of the worker are also factors which could be properly assessed in the perfect system. Any system devised, however, can only cater for averages so as to maintain the health, strength, and production of the majority at the highest level. In wartime inevitably there will be strain to the individual, particularly to key-men, but it is the average that counts.

However, certain basic factors have to be attended to: these are, of course, limitation of hours of employment, measures to promote general health and welfare, and special measures for special occupations. Where there is definite exposure to cumulative poisons, limitation of the length of spells of employment involving such exposure and alternation of employment, so that risky work is alternated with other work not involving the risk, are supremely important, as for example where there is exposure to radioactive materials.

The fighting forces could not be maintained without medical, nursing, and welfare services, and it is well if one looks upon the industrial population as a different kind of fighting service requiring similar attention. The first thing to do was to extend greatly the provision of medical, nursing, and welfare services in industry and, at the same time, to secure that workers were not dependent for a satisfactory main meal on what they could bring to work from the family larder, but could obtain such a meal as an addition in the factory itself.

The Minister, therefore, issued two Orders, one the Factories (Medical and Welfare Services) Order, 1940, the other the Factories (Canteens) Order, 1940. The former enables the Chief Inspector of Factories to require factories on war work to install doctors, nurses, and welfare officers, the latter, in factories employing more than 250 persons, the establishment and maintenance of suitable canteens where hot meals can be purchased by the persons employed. Many of the larger works, of course, had these facilities in operation before the war, and they had proved their worth. The result of the Orders was that the great extension desired was obtained, and it is of some interest to note that voluntary acceptance of these requirements was almost unanimous and in no instance was it found necessary for an actual Order to be made under the Factories (Medical and Welfare Services) Order. A difficulty, however, was to find the whole and part-time doctors and the nursing personnel required. A further point which experience has shown is the value of medical and nursing services in a factory in aiding morale under "blitz" conditions. Particularly is this true of the factory nurse—a good nurse has a remarkable influence in many ways in a factory.

In order to fill these requirements the Minister found it necessary to provide introductory courses of instruction for doctors, nurses, and welfare officers in factory work. Universities, the Royal College of Nursing, and the Industrial Welfare Society, experienced doctors and nurses from factories, and members of the department all coöperated in giving short and practical instruction, so that these officers could function with the minimum delay.

It should be observed that the function of Works Medical Officers under the Order is not to give treatment such as the worker may obtain from his own doctor, but to give such advice as will

aid in keeping the worker fit and insure him obtaining appropriate treatment quickly when required; he should study working conditions in the factory so that a high standard of hygiene, first aid, etc., is achieved and maintained, and act as a liaison officer between the factory and the various health services, including the worker's own doctor and the Medical Inspector of Factories. The Works Medical Officer must, of course, maintain a completely impartial attitude so that he obtains and retains the confidence of all sections in the works. Similarly, the provision of canteens on a very large scale in factories proved to be a great stabilizing influence and is one of the most important wartime measures in maintaining health so far in operation.

The results obtained to date are that about 96 per cent of the factories employing over 250 persons have canteen facilities and the workers are thus able to get a substantial midday meal apart from their normal rations. This has been the method adopted by my country to make extra rations available to the industrial workers and can be contrasted with the German method of extra controlled rations for their heavy workers. It is a fact that the health of our industrial workers is better than in peacetime and I think this can be put down to the fact that additional employment and our rationing scheme have made for a better distribution of our food among the poorer sections of the community, and our canteens have provided for the industrial worker the extra food he must have for sustained effort. In the smallest factories where canteen facilities cannot be provided individually or by arrangement with adjoining factories, the use of the British Restaurants—similar canteen facilities by the Ministry of Food—local authorities for the force generally—fills the schemes

In these ways the

of the factory population for maintenance of health and welfare have been catered for, and the system insures that special needs of a factory, say after bombing, are dealt with immediately.

Other general features to which reference should be made are the effects of substitution of women for men in industry and the age distribution of the industrial population. From the outset it was obvious that the most complete substitution possible of women for men was essential, and this was tackled by the Minister by registration of women, grading them by means of interview and allocating them to work for which they were most suited, and wherever possible to work for which they expressed preference. In addition very large numbers of volunteers were recruited. At the same time, by means of application of Essential Work Orders, the haphazard shifting of individuals from job to job was prevented. This stabilized experienced labor and permitted a rapid building up on these cadres.

It is obvious that now we have nearly reached the limit of conscription of men and women into the war effort. Part-time in industry will provide some further addition by means of employment of women, who have other inescapable duties.

The cheerful acceptance by women of all classes of these measures, or rather, I would say, the tremendous impetus given by women themselves to this movement is remarkable; not only that, but their adaptability and acceptance of responsibility is outstanding. Women are now engaged on work for which hitherto there has been no precedent and the substitution of women for men is still proceeding. Naturally enough this substitution casts considerable additional duties upon the Inspectorate, since many special measures have to be taken. Fortunately the department itself had been a pioneer for many years in this respect and had a nucleus of women inspectors

of some 30 per cent of its strength long before the war. These women inspectors had already proved themselves to be of equal capacity with the men and, of course, were specially experienced in the problems of women labor. The number of women inspectors has been increased since the war and the work they do both in the general work of the department and regarding the special requirements for women labor is invaluable.

A continuing anxiety to the Medical Section of the Inspectorate has been the possibility of special physical strains to women, resulting from their work in heavy occupations. Every alleged case or hint of such injury which has come to our notice—and as I mentioned before there is little of importance that does not come to our notice through some channel or another—has been carefully followed up, and so far we have no evidence to support suggestions that the work they are doing has caused damage in this way.

Much depends on the methods by which inexperienced women are introduced into industry. The best method, whether it be a light or a heavy industry, is by way of comparatively slow infiltration in the early stages. In the first place, where women have not been employed in the process before, it is necessary to select with great care a small number of intelligent women with personality and sincerity, capable of leadership—these will provide the supervisory grades of the future. The men then teach the women the job, paying special attention to the tricks of the trade associated with so many operations—for example, there is a special knack in taking off bricks from a brick press and this can be taught. Such knowledge means the difference between the likelihood of injury or not. Similar considerations apply to the making of drain pipes and many other occupations. When these key-women are thoroughly trained and experienced, then is the

time to introduce other women to be trained by them, and the substitution is complete. In fact, it seems that there is no limit to what women can do safely if they are properly trained, gradually attuned, and provided with suitable and safe clothing and decent amenities.

One cannot leave this subject of the general influences affecting health without referring to boredom. Boredom, as is generally agreed, is dangerous to health, safety, and production, but much can be done to relieve it. Suitable selected music, by means of radio has been provided by the BBC; concerts in the factories by ENSA (Entertainments National Services Association); dances, socials, sports, etc., encouraged by the Welfare Section, and experiments have been made in the use of broad color schemes in workrooms. More can be done with the object of making the worker feel that, whatever may be his difficulties owing to being away from his home and living possibly in uncongenial surroundings, his life at the factory is pleasant and supplies some of the amenities of which war has temporarily deprived him.

These upheavals in the national life have resulted in considerable changes in the age distribution of factory workers. So far as men are concerned in some industries there has been a large shift to the older age groups; thus in one industry, employing almost exclusively men at the moment, I found that approximately 50 per cent were aged between 30 and 50, and 50 per cent over 50, well over 10 per cent being 60 or over. I have not exact figures for the age distribution of the women in industry yet, but it is clear that in general here is the younger element (particularly under 25) of the factory population.

This distribution brings added responsibility to the medical services, and in this connection reference may be made to the increased incidence of

tuberculosis in young women. The increased possibilities in wartime of small epidemics in factories of diseases like diphtheria must not be overlooked. Obviously too, the strain on the older men is increased. I have no doubt that a cause of absenteeism among such men is physical inability to do the work to the capacity they did 20 years before.

Perhaps we might now touch briefly on the trends of specific occupational hazards. In general some have increased and some have diminished, as one would expect. Cases of lead poisoning, for example, have gone down because some of the main processes which caused lead poisoning have been shut down. Cases of gassing and dermatitis have greatly increased. The cases of gassing reported in accordance with the Factories Act have increased fourfold as compared with 1939, but the fatalities have increased in less proportion—30 per cent of the cases were due to carbon monoxide; 24 times as many cases of poisoning by nitrous fumes were notified in 1941 as compared with 1939, but there was only 1 death. The cases of gassing by trichlorethylene in 1941 were over 12 times as many as in 1938. In fact, almost every source of gassing in industry has produced an increased number of cases of poisoning.

Cases of toxic jaundice due to TNT are an interesting and important study. During the 13 months from July, 1916, to July, 1917, inclusive, the cases of toxic jaundice notified totalled 308, with 79 deaths. For the corresponding months of 1941–1942 there were 37 cases with 10 deaths. The reduction is, I think you will agree, astounding, and it is not due to a decreased population at risk. To what then is the improvement due? Partly it is due to improved conditions and precautions as compared with those in existence at the end of the last war, and these are still being improved, but this does not wholly answer the question. One can only surmise

that TNT is merely a precipitating factor in the production of toxic jaundice. What then is the primary factor?—constitutional perhaps. In any case it may be that a healthier population is the answer, and in this connection much credit must go to the Ministry of Food for having planned and secured a more complete and balanced diet than was possible in the last war.

Dermatitis is not compulsorily notifiable under the Factories Act, but the voluntarily reported cases are some measure of its incidence; in 1938, 2,195 cases were reported, while last year the number had gone up to 7,291—over 3 times as many. A third of these cases were in the chemical industry, including the manufacture and handling of explosives. Another large increase was associated with the engineering industry, much of it being due to oil. Dermatitis is an insistent problem because, although it is not so serious in its effects on health, it is a strain on production and the tendency to recurrence is a weighty factor. Some of the most potent dermatitis producers are found among the range of explosives, tetryl being a good example. An interesting feature about tetryl dermatitis is that, starting with a fresh population at risk, the peak in the number of the ensuing cases of dermatitis will occur toward the end of the second week of employment. It does appear that there are a certain proportion of extreme susceptibles to tetryl, and these have to be transferred to other occupations.

On the other hand, care will have to be taken to avoid wholesale transference because of dermatitis, for very obvious reasons. It seems that if workers do not develop dermatitis within the first fortnight from tetryl, they should not do so. Subsequently, if their health is maintained and the ordinary preventive measures are not only adopted but enforced, all should go well. The prime essential, as you

will agree, is thorough washing—which means actual supervision of each worker to see that this is done. It seems probable, too, that wherever possible workers with dermatitis should be kept at the work while under treatment, rather than put off and possibly become so sensitized that they can never go back to the dermatitis producing work.

The use of barrier substances, of course, has its place, but these cannot be in any sense a substitute for washing. A good deal of work is being done in my country on barrier substances, and it will be well if some standardization of suitable compositions can be achieved. Both our own department and the Ministry of Supply are to have the help of a consultative panel of dermatologists, which will help materially with the solution of these problems.

LUMINIZING

The use of radioactive substances in paints for painting instruments for aircraft and for some other purposes have caused us much thought for many years. With the expansion of this work since the outbreak of war and the rapid introduction of labor into this process, it has been considered necessary to devise and put into force a special Order embodying regulations of a preventive character. These are very strict and among other things limit the hours of employment in luminizing; prescribe special rooms for this work; properly designed benches with smooth surfaces; smooth floors; local exhaust ventilation; applicators, not brushes; glass screens between the worker and the work; protective clothing and protection of the stock of luminous compound; periodic medical examination and strict rules regarding washing; periodic blood examinations are carried out.

No illness of serious character which could be ascribed to this work has been found yet, but one or two cases with

burns have been noted and suspended, as also some workers with slight changes in the white cell counts, which may be suggestive. We have had to keep a lookout to prevent these processes being done by outworkers in their own homes.

FIRST AID ARRANGEMENTS

An important matter which has had to be kept in mind constantly has been first aid arrangements. Our proximity to enemy occupied bases has necessitated not only general tightening up of first aid arrangements in factories, but also a great expansion in trained personnel. Arrangements have had to be made to cope not only with day-to-day matters, but also with casualties due to enemy action. Moreover, the possibility that the enemy may use gas at any time has considerably complicated the situation.

The idea now is to concentrate all medical and first aid arrangements both for day-to-day and air-raid conditions in a single combined protected first aid post and ambulance room. Then if an "alert" occurs there is no transference from peacetime ambulance room to war-time first aid post, which has obvious operational advantages.

You will see that I have endeavored

to survey generally the reaction of my country to the demands the war has made on the human machine in industry; the difficulties we have encountered and the principles we are following in sustaining the health, safety, and welfare of the industrial army.

There is much more I would have liked to have discussed with you, such as the prevention of accidents, a problem of enhanced moment when the industrial population is expanded so rapidly. Perhaps, however, I might refer you to the *Annual Report of the Chief Inspector of Factories* for last year which has just been published.

At no time in our history has the individual, however he be employed, given himself to the national effort with such enthusiasm and devotion. We believe that much that we have evolved in the stress of war can be a permanent contribution to the well-being of those in industry, and this knowledge is an added spur to constructive planning in the bitter present, so that when the peace we fight for is with us, the united achievements of our two nations in occupational medicine and hygiene will be profound factors in the betterment of the human race.

War and the Health Department^{*}

A. Across the Nation

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IN the late summer of 1940 it was evident that the national defense program would place an abnormal strain on hundreds of communities. Military camps and large war industries were established in many undeveloped regions where health and sanitation facilities were of the most rudimentary kind. This presented a health hazard to the troops, for soldiers spend much of their time outside the camp boundaries. With regard to war industries, the hazard was equally great, for in today's warfare an unfailing service of supply is essential to military success. Conditions which jeopardize the health and productivity of war workers are a direct threat to national security.

In larger and more developed communities the situation was somewhat better. Modern facilities were at hand which provided reasonably adequate service for the normal population. Once the impact of the defense boom made itself felt, however, existing plant and equipment were no longer sufficient. This health situation was one factor in these communities that led the President to create the Office of Defense Health and Welfare Services under Paul V. McNutt.

Many rural areas, as well as small towns and cities, were literally swamped with construction workers who came to

erect cantonments, airfields, munition factories, and war production plants. Sudden population increases of 100 per cent were not uncommon, and in some instances communities swelled to ten times their normal size in a period of a few months. Unfortunately, the construction companies and sometimes the army failed to meet the need for supplying their workers with temporary housing, basic sanitary protection, and medical care. Trailer camps and shack towns began to dot the landscape. Doctors' offices and hospitals were soon severely overcrowded. Water supplies were threatened with exhaustion and sewage systems with breakdown. That is, assuming that there were hospitals, public water supplies, and sanitary sewerage—which often was not the case. As the construction period neared its end, soldiers or war workers arrived to man the new camps and factories. Many of them brought their families. A horde of others, service workers and camp followers of every description, also appeared on the scene, most of them entirely legitimate.

With varying degrees of intensity, this was the situation in several hundred communities. In general the picture was one of local congestion and disruption arising out of the national crisis. Not only was the problem national in origin, but its repercussions were nation-wide. Every one of the affected areas was a vital battle station in the conflict then moving closer to

^{*} Presented before a General Session of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

our shores. At that time few realized how close it was.

Because of the nature of the problem, and because local resources were usually inadequate to the task of solving it, federal aid was imperative. Fortunately one major agency of the federal government was on the job and collected fairly accurate data upon which to gauge the health needs of both individual communities and the nation as a whole. In the fall of 1940 the U. S. Public Health Service began a systematic series of reconnaissance surveys in vital defense areas. Teams of medical officers and sanitary engineers of the Service visited the areas, made a complete inventory of existing health and sanitation facilities, and estimated the types and amount of additional facilities required to care for the anticipated influx of population. The Service began expanding its grants for service by the states and localities. In many cases the local response and the community sense of responsibility were splendid. The state health departments in many states, and frequently the governors themselves, assumed leadership. The Public Health Service made lease-lend personnel available in especially needy areas. The figures showing the increase are impressive. Health units have increased by 415, or 74 per cent, and the counties served by 1,067, or 140 per cent.

But personnel was not enough; sewers and water lines were needed, quarters for the personnel, and hospitals for the normal proportion of sick. The little places and some big ones had exhausted their own resources, so in January, 1941, the President asked Congress to set up a program for grants-in-aid for facilities. In June, 1941, this federal aid for construction was made available through enactment of public law 137, commonly referred to as the Community Facilities Act. This is title II of the Lanham Act for war housing. The original appropriation provided \$150,000,000 in federal

funds to aid in the construction of needed public works, including health and sanitation installation, in communities where increased populations due to military or war industry developments imposed an excessive strain on existing facilities, and the community did not have the funds to pay for them. Later the amount available was increased by an additional \$150,000,000. The program thus launched was placed by Congress under the administration of the Federal Works Agency. Priorities will limit actual construction of schools, hospitals, sanitary installation, and recreation buildings to about \$150,000,000. Under the instructions of the President, the U. S. Public Health Service as one of the technical agencies of the government, undertook to investigate and determine the defense-connected need for all proposed hospital and sanitation projects, and to certify to the Federal Works Administrator projects which could be constructed with propriety under the terms of the Act.

It was inevitable that difficulties and delays should be experienced in a program of such scope in a time of crisis. In the first place, unprecedented demands had already been made on the construction industry by army cantonments and war industry plants. Moreover, there was considerable misunderstanding as to the kinds of projects contemplated by the Act. Many communities failed to recognize that this was to meet new war emergencies, not to remedy long standing deficiencies. It was natural for each community to press its own claims, but pretentious installations for the coming generation could not be permitted and the money had to be distributed where it would do the most good. Applications were filed for projects which bore little relation to the defense program and the total of askings ran to \$1,200,000,000.

In some cases applications for projects were filed in anticipation of needs which

did not materialize. Difficulty was often experienced in reaching an agreement with the local sponsor about its share of the cost, for many places were doubtful whether the boom would continue after the war, when they would still be paying. Some like Norfolk, Va., had been burned that way after the last war. In some localities there was no political unit with legal authority to sponsor a project or to pay for any part.

After bombs fell on Pearl Harbor many readjustments were necessary. Materials were short before that, but after December 7 it became worse. Projects had to be restudied and plans altered so as to strip critical materials.

Temporary construction took the place of permanent, and many projects had to be scaled down. This naturally affected the willingness of localities to contribute and a new basis for financing had to be worked out. Transportation, or rather its growing limitations for want of rubber, had serious effects. Housing projects had to be moved closer to bus lines or closer to factories. This meant re-study and re-location of the various utilities projects that served the houses. Moving the housing projects near the plants reduced the need for facilities in nearby towns.

In summary, during the fiscal year ending June 30, 1942, 4,468 applications were received by the Federal Works Agency. Of this number, 547 were for sewers and sewage treatment plants, 538 for water works, 567 for hospitals and additions, and 212 for health centers. The amount asked was \$140,000,000 from the government, with \$28,000,000 offered by the communities. That was the expectation if materials had been available—the actual results had to be different.

On August 1, 1942, a total of 206 water works and sewerage projects and 74 hospital and health center projects were under construction and were approximately 40 per cent completed. The

estimated total cost of these projects is about \$68,000,000.

As you can see, there remains a balance of considerable size from the Lanham appropriation. This appropriation has been considered available for grants for maintenance and operation, nearly all of which went for additional school teachers during the first year. There is some feeling now that this balance should be used for greatly expanded local services in the health, recreation, and welfare fields, and of course the needs are great. But several warning notes need to be sounded.

It is clear that the intent of Congress was primarily to provide facilities and not services. I gave the detailed testimony upon which the first appropriation was based and it showed only about \$18,000,000 for operation, mostly for schools, out of a total estimate of about \$275,000,000.

A second question arises when funds are offered to the states as in this case paralleling exactly those which Congress has otherwise provided, and has limited by certain conditions, such as auditing, civil service, etc., and which Congress has assigned for administration to other technical agencies of government.

Furthermore, all existing grant programs are through the states, not to localities direct—that is not only in harmony with the general pattern of our government but it has been adopted as the definite policy of government, applying to all grants administered through the Federal Security Agency and others so far as I know.

This general health and sanitation program has some interesting sidelights. The shortage of doctors, nurses, and other trained professional personnel is its most serious handicap. So far as doctors are concerned we are approaching the point where the army will have to work out a system under which their tables of organization will not actually be filled until their units approach the

front line action that requires that number of doctors. For they cannot themselves afford the serious depletion of man power in production and of morale on the home front created inevitably by the lack of at least minimum medical service. Only 3 soldiers in 7 ever reach the front.

The same comment applies to nurses, but here it is easier to speed up training processes in time to produce results in this war. That requires a greatly stepped up recruitment of students. I would note in passing that you will not get them unless better pay is offered to compete with war industry.

And it means further the increase of non-professional assistants, both in hospitals and in the public health field. Our hospital ratio of aides to nurses now is 1 to 1.8, compared to 4 aides in England to 1 nurse. You in the public health service will have to expand homemaker service that enables the visiting nurse to carry an even greater load.

There is even the possibility of a nurse supply board like procurement and assignment.

Do not forget industrial medicine. Our office is being asked by the War Manpower Commission to do a coordination job in the field of health and welfare within the plants, and we are counting on the full cooperation of both the Department of Labor and the National Safety Council. Here, too, the skilled personnel is rapidly being drained off, while the accident rate goes up and absenteeism increases. In a couple of months our office should be able to give a total picture, and it will not be good enough, for many if not most of the small plants and many of those rapidly expanded without prewar experience in this field, do not know how. But the government services, again working through the states, can and must be expanded to get the job done. It will be economy in man power and money in the end.

The venereal disease program has made great strides in the places that affect soldiers and sailors. Delays in providing quarantine facilities are, I trust, now overcome. It is mainly an educational problem. Army and Navy officers in the line and even in the Medical Corps needed to learn, and a new group of more than 130 specially trained venereal disease officers are out in the field doing that within the services, while at the same time they improve the whole process of treatment and of relations with the civilian health departments in case finding, etc.

Even some health officers need education. Within the last week I have heard of one state and one local health officer who say that all this noise about syphilis is an exaggeration. The state man said that it will not get to the "mental" state before the soldier gets to the front and perhaps gets shot anyway, so there is no need for all this propaganda. The local official said that the Selective Service examination rate in his city did not mean anything because it must have been acquired outside the city anyway.

That kind of attitude reflects the need for the education of the medical profession itself, and you will have to do that by vigorous campaign, not by incidental absorption. They will absorb the truth eventually before they die, most of them, but that takes too long.

Then police and judges and prosecutors need to know a lot more. Our social protection section is working with the International Association of Chiefs of Police and with the American and state bar associations. Professional backing in these fields is just as necessary as in the medical field. These law enforcement officials have just as erroneous ideas, many of them, about prostitutes and how to regulate them, and they are just as intelligent in their cooperation when they learn as the most experienced health officer.

Always at the end and at the begin-

ning we have the public, the leading citizen, the man in the street who has to have the story in his own language, and who must have a chance to learn in order to reach our goal, the elimination of venereal disease as a health menace in war and in peace.

In my book, syphilis and gonorrhea are epidemics, whether that is the right medical term or not, but there are many others. You in the health departments under the outstanding leadership of the Public Health Service and Dr. Parran are the front line of protection and you cannot fail. We cannot afford another 1918 influenza epidemic or anything like it. So when someone tells you that even the personnel and facilities of the minimal character which we can be allowed under military priorities are not necessary, you fight and we will fight with

you. We cannot allow a single hole in the dike if we are to win this war.

The whole program has required a high degree of coöperation between federal, state and local health agencies, and that must continue. I am sure that health officers and agencies appreciate the significance of this program as the foundation of national security. Yet we are all aware that every facility which might be desirable cannot be provided during the trying days ahead. It will be increasingly necessary to distinguish between what is indispensable and what is not. With intelligent selection of what we must have and vigorous promotion of our program of using those facilities we have a basis upon which the entire health organization of the country can and must be conducted for the period of the war and until victory.

War and the Health Department^{*}

B. In a Western County

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THE responsibility which now challenges every civil health organization and every health worker is the provision of the best possible health protection for the army behind the Army. To do this most effectively requires continuous, careful analysis of the rapidly developing war effort as it relates itself to the health programs of the various communities.

Governmental leaders, not all of whom are acquainted with the relative values of public health procedures, have in some cases brought pressure to establish new programs and in others to discontinue procedures of proven merit. Health administrators in most cases seek and welcome the viewpoint of governmental leaders not directly responsible for the health program. Leadership in shaping this specialized service to meet the ever changing needs can best be assumed however by the health administrator, provided he is well informed and alert. It is of paramount importance that the health program be related to the war effort, but it is also important that a sense of balance based on previous experience be maintained.

This discussion concerns War and the Health Department in a Western County. In some areas the county is a rudimentary organization. Our western counties on the contrary are strong governmental units. Los Angeles Coun-

ty's annual budget is over ninety million dollars. Over half a million of Los Angeles County's three million population live in unincorporated territory, some of which is as densely populated as its cities.

The Los Angeles metropolitan area is today one of the great industrial sections of the nation, with plants turning out planes, ships, guns, and scores of auxiliary products necessary to an army fighting a war to the finish and to a population which is now just beginning to learn the belt-tightening process necessary to victory. On the other hand, it is the richest agricultural county in the United States, producing dairy products, fruits, vegetables, grains, cattle, hogs, and other farm produce.

Health service in the unincorporated territory and in 40 of the 45 cities of the county, including a population of over one million, is administered by the Los Angeles County Health Department, which has a budget of approximately \$1 per capita served.

The program was well developed under the leadership of the late Dr. John L. Pomeroy, Health Officer of Los Angeles County for 27 years, until his death in March, 1941. Under his direction health facilities were brought to the neighborhood through the medium of modern health centers. Over a period of 20 years, 12 of these were constructed, equipped, and staffed. From these and many smaller stations the community is served.

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War has changed health department practices in Los Angeles County. Emergency protective services have been organized to meet the impact of attacks which the enemy is certain to use every effort to deliver. But more important, because of direct aid to the war effort, industrial hygiene, venereal disease control, tuberculosis control, nutrition, and other services have been emphasized.

EMERGENCY MEDICAL SERVICES

The long-range conservation programs developed by our local defense councils before the attack on Pearl Harbor were with this new phase of war placed in the background, and emergency protective services were given major consideration.

The health officers of Los Angeles City and Los Angeles County were named chiefs of emergency medical services in their respective jurisdictions. A joint medical advisory council with representation from medical, dental and nursing associations, hospitals, the Board of Education and the Red Cross was formed. Regular meetings are held for the purpose of coordinating procedure. Throughout the county approximately 200 casualty stations were set up by the Red Cross Chapters working with the chiefs of the emergency medical services. These were coordinated with the available community hospital facilities organized under a hospital committee.

The Los Angeles County Health Department has assigned to the emergency medical service on a full-time basis one trained district health officer as assistant chief of emergency medical service, one administrative assistant as procurement officer, and eight sanitary inspectors as field representatives. Two stenographers and two clerks complete the full-time personnel.

The health officer and other members of the department give various proportions of their time to the service. For instance, a carefully planned decontamination program is being organized under

the direction of the chief of the bureau of preventable diseases. This officer has worked out an authoritative outline of procedures for decontamination of persons. He has organized a course of instruction for the dentists of the community who have accepted the responsibility for leadership in this program. He has consulted with the senior gas officer in working out plans for decontamination units adapted to climatic conditions in this area.

The chiefs of the emergency medical services in our county working with the joint medical advisory council have carefully studied the available records of the experiences in those areas in Europe which have been subject to air attack. We have related these experiences to our community and have built a program which we believe will give the best protection possible when the need arises. This county with an area of over 4,000 square miles is larger than some states. Yet nearly all of its larger hospitals are located within a radius of 5 miles near the center of Los Angeles City. Each of the 45 cities has complete autonomy under charter and law. The Office of Civilian Defense in its plan of organization of local defense councils has recognized this autonomy, with the result that in our county there are 45 separate defense councils.

Because of the great distances of many of the target areas from hospitals, and because many of the smaller cities do not have hospitals equipped to care for air raid casualties, we have felt it necessary to organize self contained casualty stations equipped and manned by a staff of physicians, nurses, and first aid workers who live near these stations and who are assigned primarily to these stations rather than to hospitals. In the event of raids, casualties will be given primary care by field teams dispatched from casualty stations and sent to those hospitals having proper facilities and most accessible to the areas involved.

EMERGENCY SANITATION SERVICES

Los Angeles County has more than 400 public water systems. A working committee appointed by the defense councils, including representatives of the companies and the health departments, has developed schools for information on the preparation and use of emergency chlorinating equipment and on emergency operation. Thirty-seven emergency chlorinators have been purchased by water companies and health departments and are available for use where needed.

Mutual aid agreements between companies, both municipal and private, have been carefully worked out. Commanding officers of army units stationed in county health department territory rely on the water division of the department to recommend safe water supplies and to check routinely the water used by the various units.

The milk industry and the health departments through a representative emergency milk committee, early in December, 1941, circulated a questionnaire among all milk plants in the county. This provided information concerning the capacity operation, current operation, and the equipment available in each plant. Details concerning refrigeration, source of light, power and water supply are also tabulated. There is a complete list of all transport equipment, including delivery trucks of all types. The committee has secured a list of managers and alternates of each plant who may be reached when an emergency calls for the utilization of plant facilities. With the information available it will be possible in the event of the destruction or damage of one or more plants to divert the milk to others still able to function.

The committee has also compiled and disseminated plant protection information, and has fostered an effective plant protection program throughout the industry.

EMERGENCY HOUSING

War industries have increased the population of Los Angeles County by several hundred thousand. This has greatly taxed the available housing facilities. Federal housing projects administered through the Los Angeles City, Los Angeles County, and Federal Housing Authorities have provided during the past two years approximately 13,000 units. Private housing has made available approximately 57,000 additional units during the same period. The need, however, is far from met.

With the shortage of living space in the areas surrounding the large plants it has been necessary for some workers to travel great distances from home to plant. The average for the workers of one large plant a few months ago was 20 miles. The desirability of living near the plants has resulted in a tendency toward overcrowding in these areas. The State Housing Act and the County Sanitary Code have made it possible for the housing division of the department to prevent serious overcrowding and to maintain a reasonable standard of sanitation. It is unfortunately true, however, that thousands of the older houses, many of which are now occupied, do not approach the standards set by the Committee on the Hygiene of Housing, especially with regard to physiological and psychological needs.

With the approach of gas and rubber rationing, and considering the inadequacy of public transportation systems, the situation will become increasingly acute, and our health departments will find it increasingly difficult to maintain standards compatible with healthful living conditions.

INDUSTRIAL HYGIENE

Long before the attack on Pearl Harbor, tremendous industrial development demanded an effective industrial hygiene service. This activity of the department was born during wartime

and has been geared to fit the present needs of industry. Industrial plants in California, as in some other states, are inspected by several governmental agencies. Some of these agencies concern themselves with health hazards in industry, such as those resulting from the presence of toxic dusts, gases, vapors, and fumes.

One important facility has been lacking, namely, the resources of special equipment and trained men to make the highly technical studies necessary for actual evaluation of these hazards and provision of effective control measures. We have made good this shortage without introducing an additional inspection agency into the picture.

That this rather radical policy on the part of a public health department is workable is indicated by the fact that, within the short year during which our facilities have been in existence, we have been hard pressed to keep up with the demands. We find ourselves, therefore, in the unusual rôle of rendering scientific consulting service to such agencies as the State Industrial Accident Commission, insurance companies, plant management, and industrial physicians.

Two tremendous dividends of such a program are that no time is lost in looking for work, and, since the service is earnestly requested in the first place, the recommendations in which our studies culminate are carefully considered and used as a basis in the design of control measures.

COMMUNICABLE DISEASES

The control of acute communicable diseases has thus far presented no special problems. We have not as yet inaugurated or planned a routine typhoid immunization program, although there are those who advocate such a measure. Diphtheria and smallpox immunization were increased greatly over the preceding year.

Tuberculosis control is receiving spe-

cial emphasis because of the prospects of a long war with a consequent lowering of the economic status and a resultant increase in this disease. The tuberculosis associations of the county are strongly fostering case finding in industry. They have recently purchased on a coöperative basis a mobile 4 x 5 stereo photoroentgen unit which, when delivered, will be used exclusively for this purpose. Already the employees of several industrial plants have been checked with standard size film. One large aircraft factory is now, through its medical department, routinely x-raying all new employees, and another plant has a photoroentgen unit on order.

The health department, in addition to its regular case finding program, is making house-to-house surveys in low income areas. These surveys are at present the most fruitful source of new cases. Ten thousand x-rays uncovered 59 new active cases—almost 0.6 per cent—during the fiscal year 1941-1942. This work has been done largely with the photoroentgen units operated by the health department in its regular program.

Syphilis and gonorrhea control measures have also been emphasized. During the past year an increase of 36 per cent of new patients visited the department's 2,000 clinic sessions for diagnosis and treatment. An important increment to the venereal disease case load has been selective service registrants who are referred to us by the selective service boards through the State Board of Health, because of serologic tests for syphilis. We have thus far examined more than 1,100 such referrals. Each case receives a thorough study, which includes spinal fluid examination and cardiovascular x-rays. The clinical status of the selectee is thus determined, and many of these men are being rehabilitated for military duty. Familial and other contacts are examined.

Prostitution has been rigorously repressed by the law enforcement agencies

and an arrangement has been worked out so that all women arrested on morals charges and who are brought to the Los Angeles County Jail are placed under legal quarantine. These suspects are held—against bail—until blood tests, smears and cultures may be made. If venereal disease is found in an infectious stage, isolation is extended.

Since the task of venereal disease control in wartime is so vital a responsibility, it has been necessary to expand this service. Substantial assistance has been provided through federal funds. We are now preparing to embark upon a campaign of social hygiene education to be integrated with a general health education program and directed primarily toward workers in our local armament plants. More than 350,000 people are now employed in these plants in Los Angeles County. Most of these workers are young men and women who have never before received the bonanza wages of expanding industrialization. We feel that we have a responsibility to give to these workers the best health information available. Both management and labor have been included in the plans and have given wholehearted cooperation.

CHILD CARE

An important recent community development was the "Conference on Childhood and Youth in Wartime." This was planned by the Council of Social Agencies and jointly sponsored by the defense councils, the Board of Education and the coordinating council. The purpose was to focus attention on the importance of continuing support of public and private child and youth service agencies during the emergency. The meetings of the recent two day conference were crowded with enthusiastic participants. Problems relating to health, welfare, delinquency, work, the school, and a future program were seriously discussed by local and national experts

in the field. The opening luncheon and closing dinner sessions were attended by a 2,000 capacity crowd and many were turned away. The theater used for the general sessions was filled, and hundreds were forced to listen to proceedings by loud speaker in an adjoining hall. A series of carefully thought-out recommendations to improve the community health and welfare facilities for children was unanimously passed at the closing session, and a follow-up committee was commissioned to activate this Los Angeles Children's Charter. Already a health education program sponsored by the Council of Social Agencies and participated in by every health agency is being planned.

NUTRITION

The health officers of Los Angeles County and Los Angeles City have led in a county-wide nutrition program. During the past year almost 200 group leaders have received technical instruction. This fall these leaders are conducting nutrition discussion groups under the auspices of parent-teacher associations, schools and other groups, using standard materials made available to them. The Los Angeles Chapter of the American Red Cross, with excellent leadership, has alone given nutrition courses to over 18,000 women.

The committee sponsored a "lunch box derby" which was organized and arranged by the leading house furnishings establishments of Los Angeles. As a result of good publicity superimposed on timely interest, thousands of women inspected lunches prepared by various commercial organizations. These lunches were judged by nutritionists as to food value. The news releases following the exhibit gave scientific information of general interest on how a good lunch should be prepared. The large metropolitan newspapers are keeping this interest alive by frequent special articles and layouts.

Health workers now have the greatest opportunity for service to our country and our fellow men that has ever faced us. Let us not fail to attack our problem courageously; let us not be swayed by personal or organizational considera-

tions; but may we place every energy and facility at our command where it will serve most effectively, to the end that this struggle upon which depends the survival of our civilization may be rapidly and successfully concluded.

The Resurvey of Graduate Nurses

A NATION-WIDE survey of graduate registered nurses is being undertaken January 1, 1943, by the U. S. Public Health Service at the request of the Subcommittee on Nursing of the Office of Defense Health and Welfare Services. Every effort will be made to obtain an accurate and complete record of the available nurse power of the country.

The questionnaire being sent to nurses for the survey carries a statement by Paul V. McNutt, Chairman of the War Manpower Commission to the effect that, "The nursing shortage is urgent, both at home and on the fighting fronts. Today there is only one place for the graduate registered nurse to be—that is, on active nursing duty.

"That means all nurses. Whether married or single, whether eligible for service with the armed forces or retired, there is a place for every nurse. Lives may depend upon how quickly you respond to this call."

Return post cards have been provided by the U. S. Public Health Service and will be distributed in the states by the State Agent for the Inventory, appointed for this purpose. Local Nursing Councils for War Service and District Nursing Associations will coöperate in locating graduate nurses in their communities. The completed questionnaires will be retained in local areas, tabulations of data being sent to the State Agents, who, in turn, will send a complete tabulation for the state as a whole

to the U. S. Public Health Service in Washington, D. C.

The nation is facing a critical nursing shortage due to the needs of the armed services, the inequitable distribution of available nurse power, and to expanding the requirements of industry, public health, and hospital services.

The survey being undertaken should contribute markedly to the solution of some of these problems. It will enable the Nursing Councils for War Service to analyze their resources and needs, to locate nurses available for military service, to determine which nurses are holding strategic positions essential to the war effort, to plan for the part-time use of married nurses, to secure volunteers for emergency medical services or for Red Cross classes, and to relieve some of the inequalities in distribution. Nationally, it will provide a picture of the country's nursing resources which should form a basis for an estimate of the number of student nurses needed, the number and type of auxiliary workers to be prepared, and the ratio of nurses to population available, when distribution plans may be effectuated.

It is essential that every graduate nurse, married or single, active or inactive, fill out a survey and return it to her State Agent at once. Nurses who have not received a card may secure one from the state Nursing Council for War Service or the State Nurse's Association.

War and the Health Department^{*}

C. In an Eastern City

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CATASTROPHES of any kind, be they war, flood, epidemic, hurricane, or any other disturbance of the elements, have always dramatically and sometimes painfully, demonstrated that a well organized official health agency is of inestimable value to a community. Such events frequently accomplish what no survey has been able to do—the laying bare of unrecognized strengths or weaknesses, as the case may be. Each community might well ask itself even at this late date, “Do we have adequate health protection?” Perhaps the question has already been partially answered. The ensuing weeks, months, and years of this present world struggle will further clarify our positions.

It is realized that no two health units are the same, that they are not confronted with identical problems, and that they do not have the same resources with which to meet them. It is further realized that different sections of the country have radically different political backgrounds and patterns. The remarks that I shall make are strongly colored by the conditions, institutions and political makeup existent in the New England States from which I come.

There is one thing, however, common to us all and that is that our organizations are being tremendously influenced by the war effort and that we are in

turn trying our best to influence that war effort.

We are being disrupted and it is not comfortable. If we have been complacent, we can no longer endure that state. Whether this disruption leads downward or upward will depend largely, I hope, on the effort we make to guide that disruption.

The administrator of a full-time professional health department is confronted with numerous problems, particularly if he is placed in an industrial area, and practically all of New England represents heavily industrialized communities. In the first place he is dealing with a new population both in numbers, background, and age distribution, and one that is continually shifting. The influx is largely made up of young industrial workers, many from rural areas, so that the immune/non-immune ratio established over a period of years is disturbed. Secondly, official population figures are not available so that calculated rates are always higher than the actual ones.

Furthermore, the community health facilities were not planned for such increased numbers, and in many instances even the small scheduled expansion of existing services is made impossible by decreasing personnel and priority regulations. Making extra provisions to cope with the extra, the unexpected and the unplanned for wartime expansion appears to be entirely remote.

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Take such a community and place it in housing that is inadequate in quantity both old and new; attempt to feed a large portion of it in public eating establishments manned by transient, inexperienced, and insufficient food handlers; entertain it through the many off-shifts of industry on a twenty-four hour basis with the old facilities; service it by the changing personnel of public service agencies; and the inevitable result is the magnification and multiplication of old problems.

In addition the difficulties encountered in attempting to maintain the sanitary conditions when the owner is held down by the Office of Price Administration and is reluctant to make improvements, and when the disgusted tenant is unable to vent his spleen by moving elsewhere because there is no elsewhere, add the finishing touches to a very difficult situation.

This brief picture of a community mobilized in an urban center for total war effort can be seen anywhere on the eastern coast, and undoubtedly throughout the land.

There is an old medical saw that says, "Once the diagnosis has been made, the treatment is easy." The diagnosis of many of our social ills has been established, and new ones are being made daily, but the treatment is not easy. The case is far from hopeless, however, and this consideration leads us to ask, "How are health departments meeting the present demands made upon them by their ailing communities?"

In the first place, they are budgeting their time and rationing their services. In the second place, they are devising new ways of doing old jobs, just as industry is finding new ways and new processes to turn out old products. In places where specialized inspectors were overlapping territory with other specialized inspectors from the same office, generalized health inspection service is being set up. This means

greater in-service training, not some day, but now. The program being polished up for a launching some day must be put into action today.

Where nursing service was largely on a home visiting basis with a good deal of individual teaching, group conferences are being set up to conserve nurse hours by bringing the people to the nurse. Where immunization promotion was carried on in special groups through purely educational methods, the more rapid direct demonstration method is being employed.

Duties performed and responsibilities held by the heads of bureaus are being delegated to other members of the organization. Programs with long-range objectives, but with insufficient immediate return, like certain tuberculin testing programs, are being dropped for the duration. Other programs, where evidence was accumulating that they had little mass value, such as Schick testing in the younger age groups, are also being dropped. New office procedures are being developed with greater use of punch card mechanics.

In this connection it is frequently possible to double up with some other governmental agency and make use of partially idle equipment. Especially is such reorganization of office procedure imperative in the bureaus of vital statistics where demands for copies of vital records have bounded to unthought of heights. The unnecessary tabulation and filing of a lot of non-pertinent material against the day when it may possibly be used for some nebulous study that was conceived thirty years ago and has now become not only hazy, but actually fog-bound, has suddenly ceased. Such reorganization of the health department activities is basic to any contribution to the production front.

There are, however, other ways beside improving our regular routine duties in which health departments can be of service. In this connection it is an op-

portune time in which to examine our relationship to the community at large in which we work.

We have come to subscribe to the tenet that the health department should be the natural leader of the community in the field of health. In war this has special significance. Merely saying so, however, does not make it so. Leadership demands first an understanding of all health problems in any community, and, secondly, a desire to know as far as possible what every other agency is contributing to the entire picture. To do this the health department personnel must identify itself *with* and show a real interest *in* every community health enterprise.

No longer can we sit behind our administrative desks cloaked with the authority and prestige that has come to us out of the past. The demands of *today* are not those of yesterday, whether it be in the field of restaurant sanitation or medical rationing. If we have not been consulted about a new community health problem, it may possibly be due to lack of appreciation by the other fellow for the importance of our position, but more likely it is due to the fact that we have not been too helpful in some previous situation, and have lost face.

Community health planning in its broader sense, whether it be a rehabilitation program in a struggling private agency, the need for federal funds for additional beds in the local hospital, whether it be an open sewer near a temporary housing project, the need for day nurseries for war working mothers, a feeding program in a settlement house, funds for the training of nurses and physiotherapists in the Kenny treatment, war programs for the medical society meetings—all have bearing on the health of our communities, and the health department should be actively helpful whenever it can.

Many private agencies with well established programs have felt it necessary

to make revisions in their activities in order to gear their efforts most effectively to the national war needs. Many can be influenced to contribute to the health program. The close contact that exists between the health department and the people means ability to interpret community health needs into such agency planning.

Basic to community health planning is a complete picture of local health resources. In times of peace there may be a certain amount of competitive spirit in the field of health and medical service which falls away in war time and co-operative use of many facilities is much more easily consummated. We need now more than ever a detailed listing of what health facilities the community has to offer.

If this is done, we shall all undoubtedly realize that we were not making the maximum use of our available services, that not enough persons were aware of the existence of these facilities. Several communities have pooled such detailed information of many agencies so that all concerned had a complete picture of such services.

The public is more health-minded at the present time than ever before in our generation. Publicity of the results of Selective Service examination, the national nutrition program, more widespread preemployment health examinations, mass health surveys, Workmen's Compensation legislation, publicity of the National Infantile Paralysis Foundation, and many others have made health a news item.

The daily increasing number of articles in magazines and newspapers on health is a token of that change. The people are prepared to make greater provisions for public health—now in time of national emergency it may be possible to overcome public apathy in regard to the need for complete protection of its milk supply; now is the time to get the public clinics out of town hall

basements or other dark and dingy quarters and improve the quality of treatment rendered to the medically indigent; now is the time to improve the sanitary quality of our public water supply when a "break" may mean a calamitous breakdown in production.

The public is most sensitive to the war-associated problems involved in syphilis and tuberculosis. They know that a nation in arms has always experienced increases in these two diseases. We are anxious to increase and expand our control efforts in these two fields and the public expects it.

In tuberculosis the small film, the 8" x 10" or the 35 mm. makes possible greater case finding programs by mass x-raying of the now gradually disappearing lower economic group, and groups where high incidence of the disease occurs.

In syphilis control more and more persons can find their way to treatment with the private physicians. This calls for perfecting and extending our activities into the doctor's office so that we can hold the patient there and carry on the same control program with the cooperation of each practising physician treating the disease. This program is more difficult and calls for maximum tact and perseverance on the part of the field worker. A real bilateral relationship between doctor and health department must be developed if the control of syphilis is to reach the heights demanded by our disorganized social life.

The establishment of the Office of Civilian Defense with its state and local defense councils has brought the health department new contacts with old and new agencies. The office of Civilian Defense has taken it for granted that health departments would assume responsibility for its classic fields—water supplies, sanitation, communicable diseases. On the other hand, in the organization of large groups of volunteers for the various services, the health depart-

ments have been extremely helpful in aiding to lay the groundwork for such organization by contributing what information they had in making population studies, in zoning the cities, and in some instances developing the entire program of emergency medical services in coöperation with hospitals, medical societies, and volunteer groups.

Wherever this has been done, the planning of services has in most instances been more closely tailored to the needs of the community, and has taken into consideration the peculiarities of each municipality. Here there has been an opportunity for the health department to point the way for amicable and harmonious coöperative planning and action of the American Red Cross, the Office of Civilian Defense, social welfare groups, and official governmental agencies. It has benefited the taxpayer too in that under the pressure of the Pearl Harbor aftermath, unnecessary expenditures were kept to a minimum, and every attempt was made to utilize existing facilities and equipment. Under the general leadership of local defense councils, it has been possible to assist hospitals in developing and recruiting emergency hospital auxiliaries, as well as to stimulate and help in the planning for hospital evacuation.

We can also profit from the services of some of the Office of Civilian Defense activities. I need merely mention that air raid wardens are in a position to give us sorely needed assistance in making an up-to-date census of our rapidly shifting populations. The necessity of having more accurate figures on which to compute rates for our vital phenomena is a real one.

A particular concern of health departments is the need for coördination of programs and activities of one political subdivision with contiguous ones. This need is already very apparent and has assumed greater urgency because of the war activity. This is particularly

true where full-time health services are in operation in one city or town and part-time service in another, or where there are smaller units, all of which operate under a part-time health department system. Where large industries are operating and drawing the large part of population from many dissimilarly health-serviced towns into their plants, we have population aggregates enjoying excellent health protection for eight hours of each day, and poor or mediocre health service during the remaining sixteen hours. It would appear that the establishment of district health divisions, explored in times of peace, is far more urgent as a result of the many population cross currents resulting from the war effort.

Under this arrangement adequate

health protection for the migrant and suburban industrial worker would approach reality. The grouping of such district health services on the basis of shopping centers should not present too great difficulties since the need for them already existed, and now has become more than evident.

Never before has it been so necessary for us continually to evaluate our position and analyze what we are doing in the light of constantly changing conditions. We must be ready as never before to keep our programs fluid enough so that they can meet new and unexpected needs as they arise—alert also to detect the beginnings of the post-war problems so that prevention, the essence of all public health philosophy, may be the first step in the reconstruction period.

Basic Criteria for Qualified Leadership in the Environmental Sanitation Program*

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ALTHOUGH public health activities have expanded in many directions in recent years, embracing new and helpful developments as science progressed, sanitation continues to be one of the basic functions of the health program. In fact, one of the outstanding contributions of all times to mankind's security and comfort has been the environmental control of disease which the application of scientific sanitary principles has made possible. Looking back over the years of successive achievements in this field, we feel a surge of pride. However, during this evolutionary period, it must be admitted that we have had our shortcomings too, and in spite of our successes certain deficiencies have cropped up from time to time in the sanitation program which curtailed its effectiveness. It seems fitting, therefore, that we pause long enough to take stock of present-day objectives and organization with a view to determining how we might best achieve the desired goals of today's environmental sanitation program.

The type of organization through which we must work is a vital consideration. No matter how minor or routine actual sanitation activities may be, it is apparent that their conception and

general guidance require both medical and engineering ability of a high order. To execute efficiently the numerous duties for which he is primarily responsible, the public health engineer must possess certain basic qualifications. Likewise, definite principles of administration must be developed if the sanitation program is to function properly. The health officer's recognition of these facts, together with his full coöperation in formulating policies to achieve the ends desired, is one of the basic criteria for qualified leadership.

It appears that the basic criteria for qualified leadership in the environmental sanitation program resolve themselves into four fundamental elements:

1. Basic training and experience of the public health engineering personnel.
2. A clear understanding of the nature and scope of public health engineering by those charged with administering any part of the sanitation program.
3. Proper training and coördination of all personnel engaged in the environmental sanitation program.
4. A clear understanding by public health administrators of the function of the public health engineer with respect to administration and supervision of the sanitation program. Much confusion now existing in both the administration and performance of the local sanitation program could be eliminated if a proper realization of professional supervision could be established.⁴

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As to basic training, the Committee on Professional Education of the American Public Health Association, in a

report approved by the Governing Council October 5, 1937, pointed out that the engineer who adopts public health as a career should have general educational qualifications somewhat comparable to those of a physician entering the public health field. The importance of the qualifications which the committee outlined needs reemphasizing, in view of the fact that no leadership can be attained in the sanitation program unless its various functions are delegated to individuals thoroughly competent to carry them out. Not only must the administrative personnel be well educated and trained in the principles of public health engineering but it must be able to direct and supervise the activities of sub-professional personnel which most health departments find it necessary to employ in the interest of economy. To give assignments to these workers calling for engineering knowledge and experience they do not possess would certainly jeopardize the quality of leadership desired for an effective program. However, much can be added to the program if care is taken to allocate to those individuals duties commensurate with their ability, and if opportunities are given them for field experience under supervision. Leadership depends upon the proper utilization of supplementary workers and also upon auxiliary or outside agencies, with careful coordination of all activities into the entire sanitation program.

In view of the responsibility of the administrative personnel, it seems worth while to repeat here the subjects which the Committee on Professional Education of the American Public Health Association outlined as an essential part of the educational equipment of the public health engineer in addition to his purely engineering studies. They are:

1. *Biostatistics* sufficient to give a sound conception of the mass phenomena of disease, familiarity with methods of collecting, recording, and studying statistics on vital phe-

nomena, and ability to interpret the results of the analysis of such material.

2. General or theoretical *epidemiology*, including instruction in the collection, recording, analysis, and interpretation of epidemiological information regarding those diseases toward the prevention and control of which the public health engineer would be expected to contribute.

3. General *historical background of health administration* and a general knowledge of the organization and functions of the national, state, and local administrative units.

4. Fundamentals of common law.

5. *Sanitary biology* and instruction in *interpretation of laboratory reports* and methods of administration and operation of laboratories in connection with public health work.

6. *Food technology*, with particular reference to production and pasteurization of milk, and familiarity with methods of protection against such diseases as may be transmitted by foods.

7. *Entomology* as it applies to those insects which may be vectors in disease transmission and in methods of their control.

8. *Housing* with respect to health.

9. *Lighting, ventilation, and plumbing*, sufficient to give some knowledge of these subjects.

10. *Industrial sanitation*, particularly with reference to certain hazards, the correction of which is largely an engineering problem.

11. *Environmental sanitation* as it applies to rural areas and to recreational facilities.

With fundamental training in engineering in addition to a comprehensive knowledge of the subjects enumerated the public health engineer is prepared to make accurate analyses of environmental health problems and to work out effective methods of control; that is, of course, if with all his professional education he has developed a mind which is trained to meet individual problems in an original manner. No amount of knowledge gained can be considered an asset to the sanitation program if it is not forthcoming when needed or if it is not properly applied. Leadership calls for initiative and clear-cut objectives.

As one reflects upon the close relationship of the activities of the public health engineer to other units of the health organization, it becomes obvious

that there must be the best of supervision and direction from the central offices in order best to coördinate the activities of all health workers and to make for a unified program. This, as pointed out before, calls for a close working relationship on the part of the health officer and public health engineer, with a complete understanding on the part of both officials as to policies and methods to be pursued in solving the various problems which arise.

In the Report of the Committee on 'Coördination of Public Health Engineering Activities,'² in 1940, an attempt has been made to define more clearly the proper functions of public health engineers and other personnel in environmental sanitation, and to suggest methods for more effective coördination and supervision of activities. Under a section entitled, "Administration and Supervision," it is recommended that:

1. All public health engineering activities should be under the supervision of a competent public health engineer who should be directly responsible to the administrative health officer for all matters which affect their professional integrity.

2. The extent to which particular activities should be performed by technicians or other supplementary personnel and the details of administrative arrangement to provide for engineering supervision will depend upon the nature of the problem, the feasibility of specifying definite procedures, and the capabilities of individual workers.

3. The administration of state and local health departments should provide for consultation and interchanges of service and information so as to maintain coördination of the work of public health engineering divisions and of other administrative units.

Commenting upon this subject further, the report concluded:

In order to provide for effective supervision of all aspects of environmental sanitation, certain major administrative functions must be delegated by health officers to their directors of public health engineering divisions. Obviously these should include administration of the division office and the approval of stand-

ards and technics. Also they should include technical planning and supervision of all types of sanitation work, and appraisal of the qualifications, training facilities, and procedures of sanitation personnel. The assistance and influence of public health engineers should be further extended and utilized by consultations and joint services with other divisions. In this way the engineering aspects of the entire public health program can be adequately supervised without confusion or overlapping of administrative responsibility.

Without doubt, qualified leadership in the environmental sanitation program depends upon both technical ability and initiative in applying this ability in an effective manner. Public confidence, which can contribute tremendously to leadership, is often inspired by the manner in which local activities are carried out and by the attitudes and competency of those carrying on these activities. Consequently, it seems of the utmost importance that all workers manifest a spirit of appreciation for the objectives of the program and that they approach their particular assignments in a manner which will reflect credit upon their own efficiency and that of the health department.

The enforcement of the police power necessary to carry out the protective sanitary regulations is one item which calls for discretion and tactful handling. The worker who is wise will be able to cope with most cases with little or no friction. He will encounter difficulties from time to time, no doubt; especially if he has an apathetic public to deal with or runs into obstacles imposed by local political machinations. However, in most instances, he will be able to dispose of these matters without conflict, depending largely upon the policy and personnel of the local health department and upon some measure of individual ingenuity, common sense, and a knowledge of human relations. As a result of handling difficult situations competently, leadership in the sanitation program will be further strengthened.

There is no doubt but that the efficiency of the entire health program is judged in large measure by the quality of work performed by the public health engineering personnel, due to the intimate contact these individuals have with the general public. Therefore, at a time when so much depends upon the thoroughness of planning and carrying out of well rounded health programs, more attention than ever should be given the basic criteria for leadership in the environmental sanitation program.

While public health has reached a high state of achievement in recent years we have hardly begun to put to work the full knowledge which could liberate man further from the primitive and elementary bonds of ignorance, superstition, and disease. Think of what could be accomplished if all the defects of the physical community could be corrected! We are constantly urging as a preventive measure that individuals submit periodically to their physicians for a check-up and get all remediable defects corrected. Is it not just as important to subject the total physical surroundings to the same sort of rigid check-up by those expert in diagnosis in this field and possessing adequate knowledge to cope with the problems presented? The public health engineer's position in this respect parallels that of the physician. Of what

avail is it to see the physician several times a year if each time the individual goes back home to an environment which is a hazard to health?

As we survey conditions all around us, it is realized that there is yet a considerable job to be done—one that calls for teamwork and careful planning. Public health has met the challenges of the past and I am sure that those of us responsible for its functions today are eager and willing to put our shoulders to the wheel and to work unceasingly until we have achieved the goals we know are within reach.

"To live in health, to be free in spirit, and to pursue happiness through fellowship—these were and remain the objectives of American democracy. These are the values which now have been brought to the crucial test."³ With the improved equipment and advanced knowledge we have at our disposal today, I sincerely feel that public health will not be found lacking in the worth while accomplishments of this period or in meeting the demands of the future.

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Responsibility of Local Health Authorities in the War Emergency*

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THE subject assigned to me for discussion, namely, "The Responsibility of Local Health Authorities in the War Emergency," carries with it the implication that all areas in the United States are served by some form of local health organization capable of accepting responsibility and exercising authority. According to this interpretation, it is assumed that full-fledged staffs of local public health workers wait only to be told what to do before springing into action.

This, I am sorry to say, is far from a true picture of the situation. In spite of considerable progress in recent years, no such comprehensive network of local health services exists. In extensive areas of the United States the exercise of local health functions is vested in political jurisdictions such as townships, boroughs, villages, and, in some instances, counties, in which the population consists of from a few hundred to a few thousand inhabitants. Such local subdivisions are in most instances nothing more than geographical fictions designed to fulfil the political requirements of the horse-and-buggy era. They bear no relationship to present community life, nor do they in any sense contain institutions or administrative units which meet the economic and social needs of the population. Like the human vermiform appendix, evolution has rendered them obsolete and functionally sterile.

In such vestigial jurisdictions legal health authority is often exercised by a person who devotes only a small part of his time to health functions. He may hold his position as health officer solely by virtue of the fact that he was elected town clerk or marshall, or he may have been appointed to the job. In either case his tenure of the position is based on no qualifications beyond his ability to secure and hold office. I have had occasion to make administrative surveys of such local governmental units and to tabulate the basic occupations of those charged with the fulfillment of health duties. It was astonishing to find what a wide range of human pursuits was covered—represented were farmers, undertakers, storekeepers, railroad employees, janitors, and barbers. Indeed, some of the incumbents were unable to place themselves in any occupational category, and naively listed themselves as "unemployed."

Obviously it is futile to attempt to discuss official responsibility or health program content in areas where health activities are in the hands of such inept types of organization. These organizations are not even keyed to meeting the needs of the community in normal times, and cannot be expected to function any better during a crisis. It is important that we recognize this basic deficiency before passing important responsibilities on to such agencies with no more than a wave of the hand.

The political map of this country, in

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so far as rural jurisdictions are concerned, was made for the most part by surveyors who thought in terms of rectangles and plotted the land before it was inhabited or developed. In settling the country, however, people were motivated by economic and social factors rather than by geometry. They chose to make their homes in places where the topography, soil, and material resources were suited to the gaining of a livelihood, and as a result community outlines developed which bore little or no relationship to political boundaries. As more speedy and convenient methods of transportation were perfected, the disparity between the social and the political unit became even more pronounced. Nevertheless, in many instances the public services designed to meet the people's needs continued to be administered within the arbitrarily imposed and outdated political framework.

The obvious remedy is to extend the jurisdictional limits of the administrative unit so that they will conform in general with the boundaries of the community to be served. When so extended the health organization has a rational basis for existence and a theater of operation in which it can be expected to achieve tangible results. Of course, certain difficulties are sure to be encountered in bringing about such changes, but they are by no means insuperable. There is nothing novel or revolutionary about such rearrangements; they have been resorted to time and time again in the course of our national development. The township, once the unit of all local government, is today nothing more than a symbol of local autonomy. As circumstances warranted, its functions passed into the hands of the counties or larger jurisdictions. Maintenance of the highways was once a duty of the local road district, but with the advent of the automobile the responsibility passed to the county, only to be assumed later by the state. Likewise, districts were formed

for the administration of water supplies, sewerage systems, educational facilities, mosquito control, and other functions which could not be carried out effectively by existing official units. It has also been demonstrated that boundaries can be altered and political entities regrouped when such an expedient serves political ends. Even the founding fathers of our Republic were adept in this practice, and as long ago as 1812 the word "gerrymandering" was coined to describe it.

Local public health agencies have lagged behind other branches of public service in adjusting their organizational structure to suit changing social conditions. It is now a question of determining how to accelerate the natural process of adaptation in order to meet an emergency situation.

The American Public Health Association, through its Committee on Administrative Practice, has recently formulated a provisional set of basic criteria for local health services. In its report the committee states that all population units or areas in the United States should be served by local health units which are directed by full-time medical health officers. In general such local units should serve a population of not less than 50,000 and not more than 250,000, except where one or more counties constitute a single health jurisdiction in a metropolitan region. The area served by one unit should not extend more than 40 miles in any direction from the headquarters office. The units so conceived may be single-county units, multiple-county units, or district units including a part but not all of one or more counties. The committee recommends that cities located within a county be served by an inclusive type of county or district health unit.

The report assumes that most services of a clinical nature will be performed by part-time medical personnel drawn from the local practising profession. It also

states that a unit should have not less than 1 nurse for each 5,000 of population; 1 sanitarian for each 25,000 to 35,000 population, with at least 1 member of the sanitation staff of engineer grade if the population is 50,000 or more; and a sufficient clerical force to keep records and leave the technical staff free for professional work.

The objection may be made that redrawing the health map on the basis of such principles is a highly theoretical procedure. This, however, is not so. Today, we cannot deny the immediate and practical value of any thoughtfully conceived effort to put on a rational basis the distribution of our nation's health services. The war has brought about a tremendous disruption in community life in hundreds of localities throughout the country. Health problems have been multiplied and magnified, whereas our resources for dealing with these problems have diminished. Shortages of many kinds of essential materials, and above all of personnel, are already crippling the inadequate services hitherto maintained. At the same time, all available evidence points to a long war and to a depletion of man power and materials which will make our present plight seem enviable by comparison. Rationing of several kinds of civilian commodities has already been put into effect, and restrictions will soon be placed on many more. There can be no doubt that a redistribution of health services will also be necessary.

The U. S. Public Health Service is now receiving a steadily increasing number of requests, under its grants-in-aid program, for financial assistance in the support of incomplete health units. A unit which has been operating under the direction of a full-time medical officer loses that officer to the military forces, and a request is made that the unit be allowed to continue without a full-time medical director. Obviously, this is not a feasible solution if a satisfactory

standard of service is to be maintained. Instead of attempting to operate in a headless manner, such a unit should pool its resources with a neighboring unit which has a medical health officer. In this way it can continue to operate under the competent direction which is necessary to produce desired results.

What I have said concerning the necessity for complete coverage of the country by full-time, professionally staffed health units may arouse some misgivings in those who advocate state administration of local health services. Considerable difference of opinion exists with regard to the relative merits of centralized vs. local direction. This, however, is not the subject I am discussing. I recognize that there are circumstances of time, place, and type of service which bring out the advantages of one plan as contrasted with the other. The point I wish to make is that, regardless of where ultimate authority lies, it is chiefly at the community level that the service must be performed. And, as I said before, by a community I do not mean a village or an artificially established political unit. Almost all sections of the country today are tributary to some population center which satisfies a majority of the inhabitants' needs. To such centers people go for education, recreation, the purchase and exchange of commodities, and, in the main, for medical treatment. They do not look to the crossroads village for satisfaction of these needs, nor do they depend upon the state capital.

It is in such recognized community centers that public health services must be established and maintained if they are to operate economically and efficiently. Whether the local health unit should have a high degree of autonomy or whether its activities should be directed by a central state authority is a matter of opinion or local tradition, and is perhaps relatively immaterial. What is important is that the health unit gear

its activities to the needs of the people, and that it provide an integrated set of services with a minimum of waste motion and expense. To do this there must be direct contact and community of interest between those who provide the service and those who benefit by it. When such conditions prevail the health unit is in a position to become a potent force in the community.

Despite an intricate mosaic of local jurisdictions, the administration of essential public health services in Pennsylvania is centralized to an unusually high degree. This system has some decided advantages. It is, for example, well adapted to overcome the Balkanization which frequently characterizes health services operated as locally autonomous units and supported principally by local taxation. This does not mean, however, that local health services can be operated successfully over a period of years by remote control through a corps of circuit riders who make occasional visits to the individual communities. Such persons have no roots in the community and cannot hope fully to understand or meet its needs. There is a tendency among health workers of this type to go into a locality more or less in the manner of traveling salesmen, each with his own stock-in-trade. In peddling their wares they often find themselves in direct competition with others from the central office who have their own stories to tell or their own lines of goods to sell.

Now that transportation has been drastically curtailed, the visits of these emissaries will necessarily be less frequent. The state health department's control will thus become even more remote, and the communities will have to depend to a greater degree upon local initiative and resources. I am sometimes inclined to believe that the curtailment of transportation resulting from the war may actually serve to enrich the content of public health programs. For some time, at least, our health circuit riders

may be forced to remain static long enough to do a thorough job in one locality before moving on to the next.

Let us assume for purposes of discussion that a community possesses a health organization capable of carrying out a satisfactory program. What then should be the content of the program? The situation at this time calls for re-emphasis upon those basic aspects of public health activity which engrossed the attention of our early health administrators—elementary sanitation and law enforcement. By this I mean the maintenance of ordinary communal cleanliness—a safe water supply, proper disposal of sewage and garbage, milk that is fit to drink and food that is fit to eat, restaurants that are conducive to appetite, absence of vermin, decent housing, and a safe and hygienic working environment. To those basic needs must be added the provision of medical care, a function which was originally a part of poor relief but which increasingly is being recognized as an essential part of a health program.

These basic activities—sanitation, law enforcement, and medical care—are today more or less taken for granted, as if they would take care of themselves. In recent years greater stress has been placed on certain less basic functions of an educational or promotional nature. These activities are not without considerable value, but there are some things which simply cannot be talked or educated away. One is filth and another is sickness. There is unmistakable evidence that simple sanitary services and general medical care—neither of which we have ever developed to a satisfactory degree—are now breaking down in many areas in the country. I believe that for the duration of the war the chief instruments in the health officers' armamentarium will once again have to be the shovel, the club, and the pill bag. A health conservation contest is not the way to approach the problems of a

population that has become lousy, nor will an educational campaign serve to remedy a water supply that is being polluted by an insanitary trailer camp. Fortunately, war and calamities in general have a way of emphasizing the elemental factors in human existence.

There are several reasons for the breakdowns which are now occurring. First, there is the dislocation of population to which I have already referred. Second, there is a scarcity of materials upon which we have come to depend for various types of sanitary devices and installations. There is likewise a growing labor shortage, and an acute lack of engineering personnel. With regard to the distribution of medical care, the situation is truly alarming in many communities. Doctors, dentists, and nurses have been withdrawn in large numbers from civilian service. At the same time, people once again have money to spend, and are seeking medical care which they could not afford prior to the war boom. Industrial hygiene and related medical service, largely neglected throughout our years of remarkable industrial development, have now taken on compelling significance because of the urgency of war production.

In addition to intensifying the need for action along traditional lines, the war has also brought to health departments some entirely new problems. Chief among these are the many-sided aspects of what is termed "civilian defense." This includes the organization of emergency medical and hospital services in preparation for possible enemy action, the establishment and maintenance of blood banks, and the protection of public water supplies against contamination or actual damage.

It is quite apparent that these increased duties—both old and new—cannot be discharged without readjustments in organization and methods. Ingenuity is demanded in many respects, but most important of all is the utilization of

available personnel to the greatest possible advantage. This involves not only rationing of services, but redistribution of skilled workers. Professional personnel must be reassigned to localities and tasks in which their services are most needed. After suitable orientation training, auxiliary personnel should be utilized for the performance of many functions heretofore discharged by persons with special professional qualifications and training. Educational and training processes by which students are prepared for employment in medical, sanitation, and allied fields must be accelerated.

In turn, if existing staffs or obtainable personnel are to be employed most effectively, reorganization of many types of facilities and services is essential. Idle equipment must be put to use, and all resources pooled so that they will be of benefit to the largest possible number of people. Time- and labor-saving procedures must be adopted. The provision of medical care, for example, must whenever necessary be organized around clinics and hospitals. Increased attention must be given to methods of financing medical care for the individual so that care will be more readily available to a larger percentage of the population.

These emergency measures, however, cannot be effected except around some administrative unit with the legal authority and the technical ability to put them into practice. The health department is unquestionably the organization best suited for the assumption of this responsibility.

It is evident that some of these measures cannot be applied effectively without introducing the element of compulsion which is daily coming to play a greater part in our lives. Moreover, since some of the problems are statewide or even nation-wide in scope, local initiative and responsibility will not always suffice. Nevertheless, even though state or federal action may be needed,

the local organization must constitute the framework within which the program is implemented. Regardless of the agency responsible for the over-all planning, and regardless of whether the personnel employed are on the local, state, or federal pay roll, operation must be channeled through existing or improvised community facilities and must be related to the communities' needs.

A declaration of the American Public Health Association, adopted by its executive board in December, 1941, states:

The effective modern health department, as now conceived and at present organized in many states, cities, and counties as a branch of civil government, comprises a medical, sanitary, and related biological and social competence which enjoys broad authority to meet a wide variety of medical and environmental emergencies. . . .

. . . the health officer and his staff must be alert to extend, and, if necessary, to modify the usually accepted health functions to meet

the multitude of exceptional situations certain to be created by the state of war and by the mobilization of all the people and their industry to support the armed forces.

This is a call for direct and vigorous action. It demands something more than reliance upon a process of evolution, which is a dignified term for the method known as "muddling through." This time, an attempt to muddle through will mean defeat.

The future pattern of health organization in this country depends largely upon how this challenge is met. If the basic system we have evolved slowly over a period of years proves adequate to the demands of the emergency, it will be retained as the foundation upon which the nation's future health services will be provided. If it fails, a reorganization, sweeping in character, appears to be inevitable.

Hypothetical Relationship of Water Supplies to Poliomyelitis*

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THE hypothesis that poliomyelitis may be water-borne is not a new one. It has received consideration by various investigators ever since the infectious nature of the disease was recognized a half-century ago. Up to 1937 the concept received little support. During the past five years it has recruited many advocates. It is proposed here to review very briefly the present status of the laboratory and epidemiological evidence upon which this hypothesis rests.

Fundamental to the problem of how poliomyelitis is transmitted is knowledge of how the virus enters and leaves the body. Laboratory experiments on monkeys and chimpanzees and studies of human tissues obtained post-mortem indicate that the virus *enters* through the alimentary tract,¹ but do not resolve the question as to whether it is conveyed by air particles—droplets, droplet nuclei, or dust—or via contaminated articles, food or drink, or by both. In similar manner, laboratory studies² leave doubt as to whether nasopharyngeal secretions or intestinal discharges, or both, are of importance as a medium of *exit* for the virus in order that it may reach new hosts. Recent discussions have centered attention very largely upon the latter as a

possible route of transmission, that is, by fecal contamination.

The studies of Kramer, Gilliam, and Molner,³ of McClure and Langmuir,⁴ and of Piszczek, Shaughnessy, Zichis, and Levinson⁵ have demonstrated that the virus may be present in the stools of persons not clinically ill or with illness of ill-defined character, as well as in those of persons suffering from paralytic or recognized abortive attacks. It may be recovered only upon a single occasion or found to persist up to several weeks. There is one instance on record⁶ in which the virus was isolated from the stool of a child who had sustained a mild attack of the disease 123 days prior to the time when the test was made. It is generally agreed that the amount of virus in feces of human cases may be large, much larger than the amounts found in nasopharyngeal secretions. Paul and Trask⁷ estimate that between 1,000 and 10,000 doses infective for the monkey may be present in 50 gm. of stool. *These facts suggest that in nature human fecal material is a copious source of the virus of poliomyelitis. From this source it has been traced for short distances and limited time periods in domestic sewage.* Paul and Trask,⁸ in a large number of trials, were able to recover it in 4 instances where samples were collected in close proximity to hospitals in which patients with infantile paralysis were being treated. When samples of urban

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sewage were collected at random after epidemics in large cities, 22 tests were negative. When samples were collected routinely over a long period of time, at intervals of about 1 month, in New Haven and in New York, 85 were negative and from 2 the virus of poliomyelitis was recovered.

The 2 positive samples came from the Manhattan Grit Chamber, located in the heart of New York City—one in September, 1940, and the other in October, 1941—at a time of year when the incidence of the disease is maximum. In neither year, however, was it regarded as being epidemic. These observations may be interpreted as suggesting that under some conditions in human sewage the virus remains stable and may survive in detectable quantities for at least a short time.

Laboratory experiments also lend support to the idea that the virus may remain viable for some time outside of the human or animal host if conditions are favorable. Suspensions of human feces kept in the refrigerator for months may be found active upon inoculation into monkeys.

Moreover, it must be granted that it is theoretically possible that this virus in polluted water might pass through a treatment process used in purification for drinking purposes which would be adequate to retain or destroy *Escherichia coli*. Bacteriological standards of safety, using the density of *Escherichia coli* as an index, and based upon experience with typhoid fever, would not necessarily apply to this problem. Whether the chlorine concentrations ordinarily realized in the treatment of drinking water or of swimming pools is sufficient to inactivate the virus of poliomyelitis is still a matter of uncertainty.^{7, 9} Many experiments designed to answer this question have been performed, but because of technical difficulties they do not lend themselves to ready interpre-

tation of practical operating conditions. The same criticism may be offered with regard to the recent claim of Carlson, Ridenour, and McKhann that purification as ordinarily employed fails to destroy or remove the virus completely.¹⁰

Granting the possibility, the fact remains that up to the present time no one has conclusively demonstrated the presence of poliomyelitis virus in water used for drinking or bathing purposes, with one possible exception. Carl Kling,¹¹ in the State Bacteriological Institute in Sweden, has for several years tested samples of water from supplies which epidemiological observations suggested might be involved in transmission. Methods have gradually been improved. It is reported that during the period from July 1, 1938, to June 30, 1939, 27 such samples were tested by animal inoculation, and one of these was regarded as positive.

This positive sample came from a well which was suspected of being the source of infection of a 6 year old boy living on the same property. It was obtained the day *after* discovery of this case. The well was in dilapidated condition with walls of rubble and obviously open to human pollution. A virus recovered by animal inoculation was classified as belonging to the poliomyelitis group, although the strain had a low virulence for monkeys (*Macacus cynomologus* and *Macacus rhesus*) and the histological changes were not altogether typical. This is a suggestive result and, so far as I am aware, the only report in the literature of a poliomyelitis-like virus recovered from water which was customarily used for drinking purposes. However, failure in this respect with the methods available does not prove the absence of virus in sufficient quantities to infect, any more than does failure to demonstrate typhoid bacilli prove the innocence of a suspected water supply as a source of typhoid cases.

In summary, the evidence and considerations from the studies which have been briefly reviewed are consistent with the hypothesis that poliomyelitis may be water-borne. But they are also consistent with the hypothesis that this mode of transmission is unimportant, even though direct transfer of fecal material from infected to non-infected individuals in close contact is the ordinary route by which the virus travels from person to person. Indeed, they are not inconsistent with the hypothesis that the virus in feces is inconsequential in transmission, and that effective exit for transfer to a new host is made by air-borne secretions of the upper respiratory tract.

That water is a medium of transmission of *biological importance* can be accepted only if it can be shown that the behavior of the disease in nature can be satisfactorily explained on this basis. It is not sufficient merely to show that the causative parasite leaves the body of the human host in feces and survives a short time in sewage. If this were the only requirement, tuberculosis might have been classified as water-borne. It is not sufficient that a group of cases of an infectious disease be traced to drinking water polluted by back-siphonage in a plumbing system. A group of students at Michigan State College were infected with *Brucella melitensis* as a result of such an accident.¹² It is not sufficient that cases occur along water courses and river valleys even if the microparasite were recovered from samples of the water. Two small epidemics of tularemia in man, one in Russia¹³ and one in Turkey,¹⁴ have been attributed to drinking from streams which were contaminated with this organism. Jellison, Kohls, Butler and Weaver¹⁵ have reported an epizootic of tularemia that affected the beaver in numerous Montana streams from the late fall of 1939 to the late spring of 1940. Water from

four streams was shown to be contaminated with *Pasteurella tularensis*. This suggested the possibility that contaminated stream water might be an occasional source of human infection, yet it does not justify classification of human tularemia as water-borne. More evidence than this is needed. *It must be convincingly shown that the behavior of a disease in human communities is such as would be expected if the causative parasitic microorganism were dependent for continued dissemination, in part, or at times, upon the medium of contaminated water.*

Specifically, what is the behavior that would justify such an inference? The question can best be answered by reviewing certain observations which have been made with regard to the prevalence of cholera and typhoid or paratyphoid fever; dysentery, or diseases generally accepted to be water-borne.

In general, their prevalence has been correlated with a poor sanitary environment including, but not necessarily depending directly upon, water supplies subject to human fecal pollution. In communities with a common water supply subject to such pollution, the incidence has tended to be excessive and cases were scattered throughout the population in time, in place, and in persons (except as modified by immunity), as would be expected from a wide dissemination of the infective agent through the water distribution system. In some instances it has been possible to show that the incidence of one of these diseases was significantly greater in the group of people using the suspected water supply than in another or other groups using a different supply but *alike in all pertinent respects*. A classical example is John Snow's analysis of the mode of communication of cholera in South London.

In other instances it has been possible to show that an abrupt decline in incidence immediately followed the in-

stallation of a water purification plant with living conditions changed in no other important respect. Or, *per contra*, increased incidence has abruptly followed some breakdown in the treatment process or distribution system of a common water supply. Numerous examples of these contingencies can be found in the typhoid history of American cities and towns.

Perhaps most convincing of all are the explosive outbreaks in which groups of people were simultaneously infected, and it was conclusively shown that the only medium of common dissemination to which all or nearly all could have been exposed was a water supply subject to human pollution. Finally, it is to be pointed out that wherever sanitation has been improved, including the improvement in water supplies, these diseases have been unable to maintain their prevalence in human populations and have tended to decrease or disappear. This is the sort of evidence upon which it has been generally accepted that they are or may be water-borne.

Turning now to the extensive literature on poliomyelitis which has accumulated since the initial observations of Wickman, *epidemiological evidence of this character is conspicuous by its absence*. The incidence of this disease has not been correlated with sanitary environment. It has never been shown that either the epidemic or the endemic incidence of poliomyelitis is significantly associated with the quality and safety of water supplies as determined by either a sanitary survey or by bacteriological analysis or by both. Assuming that filtration and chlorination are ineffective in removing the virus, then, for example, it would be expected that the incidence would have increased over a period of years in the cities which obtain their water from the Ohio River with its speedily increasing load of sewage pollution from domestic sources. On the other hand, it would be ex-

pected that small communities supplied with water, whether treated and chlorinated or not, but from watersheds or underground supplies which careful sanitary surveys have shown were protected from human fecal pollution, would have a conspicuously favorable experience with poliomyelitis, yet sharp outbreaks have occurred in such communities. When poliomyelitis has invaded large urban communities whose population is served simultaneously by a common water supply, the cases have not been scattered in time, in place, and persons in the sudden random fashion which is expected. The disease has characteristically manifested a slow radial or progressive spread from an initial focus. When poliomyelitis has occurred in rural areas, it has moved at a strikingly constant speed from place to place in a wholly unpredictable manner, but unaffected by the character of the local private water supplies. Finally, and perhaps most important of all, there is on record at present not a single instance of an explosive outbreak of this disease which has been attributed to simultaneous exposure of a group of people to a common source of water.

Nor can the absence of epidemiological evidence incriminating water as a medium of transmission be attributed to insufficient investigation. There are now in the literature a large number of studies made by competent epidemiologists of the conditions under which poliomyelitis occurs and spreads. Many of these investigators have had extensive experience in tracing water-borne epidemics of typhoid. Even if it be true that most outbreaks, or the majority of cases of any single outbreak of poliomyelitis, are subclinical in character, it seems quite improbable that important and pertinent facts with regard to the behavior of the disease would have remained concealed. There have been many occasions when the recognized paralytic cases were sufficiently numer-

ous to afford an index or a clue to what was happening.

In conclusion, although evidence derived from laboratory studies is consistent with the hypothesis that poliomyelitis may be water-borne, it is also consistent with transmission by other routes. On the other hand, this hypothesis is not satisfactory in explaining the natural behavior of this disease in human populations. Its epidemiological pattern differs significantly from that of other diseases known to be water-borne. There is at present insufficient evidence to justify the belief that water is a medium which is of any practical importance in spread.

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Joint Responsibilities and Indirect Services of the Health Department in Environmental Sanitation*

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ISOLATIONISM is a policy as unfortunate for health departments as it is for nations. Where the objectives are actual improvement of community health and sanitation, a progressive health department must of necessity integrate its services with those of many other agencies. It must also accept the responsibilities of coöperation so that there may be mutual applications of authority, technics, and facilities to problems common to several agencies—governmental or private.

The field in which opportunities are most numerous and varied for such coöperation and extension of services is that of environmental sanitation. Here the health department has contact with many other departments of government in the promotion and maintenance of an orderly and properly functioning society. The technics by which the community maintains its material functioning are essentially engineering. Construction, production, transportation, communication, sanitation, are basically engineering activities upon which the modern civilized community depends. Any health authority which would participate effectually in the physical functioning of the community must be able

to comprehend its engineering problems and to contribute engineering judgment and service to their solution.

It follows, as a matter of logic, that such a health authority must contain within its organization one or more competent public health engineers or have readily available the services, as necessary, of a sanitary engineering staff. Without such personnel, a health department is likely to be an ignorant or helpless bystander in vital aspects of a community's development or to contribute only superficially and sporadically to its hygiene. The community is an organic unit and the engineer is its physician.

This discussion deals with the relationships of the health department through its engineering division with other engineering and technical agencies and organizations. The background of the discussion is the writer's experience in a county department of health (Nassau County, N. Y.) serving a population of some 450,000 included in 68 municipalities. It is not to be inferred that the various aspects of the joint responsibilities and indirect services here reviewed have been fully or even partially exemplified in the writer's own department. However, in common with public health engineers elsewhere, possibilities of coöperation have appeared and have been developed more or less as local circumstances and resources would permit.

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It is the usual experience of public health engineers to undertake—usually below the state level—their work in places where such service is long overdue and where neglect of sanitation has resulted in an accumulation of distressing conditions and bad sanitary practices. In such localities other departments of government are likely to be well entrenched and habituated to minor, and perhaps to major, impositions upon health department personnel. Local officials and the public in general usually have developed peculiar ideas about the functions and responsibilities of the health department, particularly with respect to sanitation and the extent of public health police powers. Under such circumstances, the local health authority upon acquiring engineering personnel must thereupon undertake the complex task of overcoming past negligence, giving guidance to the further sanitary development of the community, and educating the associated officials and the public to an understanding of its legitimate activities and interests in the province of sanitation.

Concerning environmental sanitation, the most important relationship of the local health department is that with the state health department and its engineering division. The state's supervision of major utilities such as water supply and sewerage is essentially an effort at remote control and is usually inadequate until, by districting or by the acquisition of public health engineers in local jurisdictions, technical service becomes available on a day to day basis rather than at intervals of months or years. This relationship between districts, county, and city engineers and the state engineering division should be founded on mutual confidence and interdependence. Assuming that reasonably sound engineering judgment is being used, each should give positive and consistent support to the other in decisions, programs, and projects. The

curse of political interference in engineering matters can best be resisted by a strong professional liaison between the state and local engineers. Moral stamina is required at both ends of the line to checkmate expediency and fence-straddling.

With the concentration of tax moneys in the state and federal governments and the paternalistic return of such funds for the support of local government functions such as public health work, a new phase of joint responsibility and of indirect service has developed, at least potentially. The principle of this relationship is that the contributing agency, clothed in the mantle of omniscience, imposes higher standards of personnel and performance upon the local department as a condition of the aid. The enforcement of such standards would indeed constitute the highest type of indirect service to a community, but too often the fear of offense to powerful political groups or to entrenched professional organizations permits flagrant misappropriation and waste of these funds. Statesmanship and courage of the highest order are needed to prevent the employment of incompetents and to oust those who hold sinecures. Progress in public health administration and service is cheap where it costs only the enmity of the greedy and the irresponsible.

In the fields of water supply and sewage disposal, organizations of administrative and operating personnel are quite important and have been strongly fostered by state sanitary engineers. Local public health engineers can contribute much to the functioning of these associations by bringing isolated local officials into contact with their professional groups and with each other. In Nassau County, the officials of 42 public water systems were found to have no organized relationship and little acquaintance with each other. In initiating a public health engineering program af-

fecting these supplies, the engineers of the health department found the lack of such an organization of water superintendents a serious handicap to the quick and effective dissemination of information and in enlisting general understanding and support of the work. Consequently, the health department took the initiative in forming such a group and has since furnished the clerical service and sustained its continuity. This activity has brought the water supply officials into close and sympathetic relationship with the health department, a situation contrasting sharply with their previous indifference to local health officers and remoteness from the state sanitary engineering division. Currently, this organization of water superintendents has proved to be extremely valuable in carrying out measures of wartime preparedness for civilian defense and, more particularly, the New York State mutual aid plan for water supply service, sponsored by the State Health Department.¹

Neighboring health departments have many opportunities to reinforce each other's dealings with problems of sanitation. While the state is usually the coordinating agency where waters are used jointly for public supply or waste disposal, there are many situations in which direct relationships promote quicker solutions of problems and a beneficial exchange of information and coordination of efforts. This is possible, however, only where each department has technical personnel speaking the common language of engineering and sanitation. The writer recalls his early efforts in the metropolitan area to establish helpful contacts with the New York City Department of Health. It was a disappointing experience because that department, the largest in the world in point of personnel, then had not one public health engineer on its staff, and its sanitary program was unorganized and shaped largely by the force of ex-

ternal events. Fortunately that situation was changed with the appointment of a capable public health engineer as Deputy Commissioner of the Health Department.

Since that event, satisfactory common approaches have been made to many joint problems in the metropolitan area. The establishment of local standards for bathing beaches is an example in which, under engineering direction, basic information regarding the intensity of pollution in tidal waters was obtained by systematic sampling. Ratings of beaches were then established in the several health jurisdictions, taking into account the proximity and volume of pollution sources and the recreational necessities of tributary populations. Through press releases the public was given reliable information from authoritative agencies, thereby relieving several newspapers of the occasion for well meant but actually presumptuous reports on bathing waters based on inadequate sampling and reportorial interpretations.

Responsibility for jointly used milk supplies furnishes opportunities either for conflict or coöperation among local health departments. The feeling on the part of one department that another does not have professionally competent and responsible personnel for the maintenance of a milk sanitation program is perhaps the most common obstacle to a sharing of the job. This, if true, is certainly a valid reason for distrust for which, however, the remedy is obvious. In the metropolitan area, as experienced public health engineers and technical personnel have been placed in charge of milk sanitation, an increasing degree of uniformity of regulations has been achieved, accompanied by a more confident acceptance by one department of another's work.

Present-day food sanitation concerns perhaps more agencies than any other problem in public health. The widespread sources of food supplies, their complex processing and transportation,

and the vast amount of food sold and consumed outside the home involve the local health department in a labyrinth of relationships with other regulatory bodies. The division of responsibility is usually not clearly defined and the overlapping of authority is confusing but, as these agencies slowly evolve better regulations and enforcement procedures, the integration of food control is improving.

Perhaps the most difficult relationship is that between local health and state food authorities. While the background and extent of authority exercised differ considerably in the various states, there is usually a conflict of some degree between the public health and the agricultural or marketing points of view. The state food control agency must of necessity concern itself with food quality, misbranding, adulteration, and other fraudulent practices and should properly direct its major efforts at those points where foods are handled or processed in bulk. Its local inspection should be chiefly a check on the observance of required standards and practices. This state agency must also deal with sanitation but chiefly from the standpoint of contamination, living or inert, being an aspect of adulteration. However, no practical degree of state inspection can furnish the local protection and control necessary to maintain decent standards of sanitation, particularly in the great numbers of retail establishments.

Unless the local health department recognizes rather broad responsibilities in the maintenance of food quality, it may leave a critical gap in the service properly demanded by the public. Food buyers consider cleanliness and wholesomeness of foods to be legitimate concerns of the health department, even though many such aspects of food sanitation have no obvious statistical relationship to communicable disease. The local health department can afford to ignore adulteration and misbranding of

foods only if the state agency is functioning effectively, in which case the local responsibility becomes one of co-operation with the state inspection service in uncovering and reporting violations and in itself doing well the major job of sanitary control of foods and food selling places.

The production and distribution of shellfish afford opportunities in the maritime states for coöperation of seaboard health departments with the state agency having supervision of this food. In New York State, the Conservation Department, charged with this responsibility, does not have police power for the control of pollution which may ordinarily be exercised by health departments. Consequently, in recent years this agency has had to close more and more shellfish growing areas because of increasing pollution without being able to deal constructively with the problem by abating such pollution. The establishment of a county health department in Nassau County made possible a reversal of this destructive trend. Public health authority coupled with engineering service has accomplished the abatement of hundreds of discharges of sewage and the forestalling of many more along extensive shore lines.

The U. S. Food and Drug Administration, in its enforcement of the new federal food, drug and cosmetics act has displayed a welcome desire to establish mutually beneficial relationships with local health departments. Through its division of state coöperation, this agency has extended its coverage of the country and enlisted the aid of qualified local food inspection personnel by giving them definite individual authorization to act as its agents in certain respects. These local representatives may also give vital assistance through their ability to use public health police powers for the prompt embargo or seizure of foods under circumstances in which the federal agents may be handicapped by the slower

and more devious procedures of the act.

Another federal agency with which the local health department may cooperate to advantage is the Federal Housing Administration. Residential water supply and sewage disposal are always critical problems in unsewered areas, to which the general specifications of the FHA may not apply without local modification. In Nassau County, the FHA was found to be depending upon local health officers for certificates of approval of private sewage disposal installations where the local health authority had no standards, no basis of judgment, and no uniformity. Upon the establishment of the county department of health, this relationship and service was seized upon as a means of clearing up private sewage practices. Engineering standards for design and construction, adapted to the conditions on Long Island, were prepared and were then accepted by FHA. Some 6,000 certificates have since been issued. Without having to place all private sewage disposal construction on a permit basis, the health department has thus taken advantage of the FHA plan to force numerous developers, builders, and sewage disposal contractors into proper practices, and has thereby rendered a valuable service to FHA, and to numerous purchasers of homes.

With respect to the housing problem, the local health department has many opportunities for indirect service through coöperation with other agencies concerned with slum clearance. First of all the health authority must make clear the limits of its special powers, the involvement of other departments, and the necessity of the community exercising its general police powers. The essence of housing improvement is the provision of new low rental housing, and it is only in conjunction with such a program that the health department can grapple very extensively with rehabilitation and strict enforcement of sanitary regulations.

In New York State, the legislature

has empowered municipalities to establish housing authorities which may acquire land, raze slum buildings, and construct and operate housing projects. It is with such an agency that the local health department can collaborate to best advantage in giving survey information and guidance, and in enforcing sanitary regulations contributing directly to the housing improvement. This may involve furnishing personnel and carrying through prosecutions which would be difficult for a housing authority to handle.

When the health department, such as in a county, has jurisdiction in a number of municipalities, there may be opportunity for coördinating housing activities and for stimulating parallel attacks upon bad conditions in adjacent areas which would minimize the shifting of population from the unimproved to the improved area. In the writer's experience, the local housing authorities are sometimes appointed for the purpose of conducting delaying actions rather than for a genuine attack upon the local slum conditions. In such a situation the health department must beware that it does not lend itself to an attempt to drive out of a particular community an undesired element of the population through the destruction of outworn dwellings on any considerable scale and without replacement.

In connection with housing there exists between the health and welfare departments a joint concern for the living quarters of families on relief. Welfare authorities are continually plagued with the problem of finding accommodations for tenants whom many landlords consider undesirable. Such families, with or without the guidance of welfare supervisors, may move into unsuitable dwellings, the occupancy of which may thereupon create unsanitary conditions and violations of the public health regulations. The necessity of the health department's prosecuting a landlord or

evicting a tenant to abate a violation where rents are being paid from public funds could be largely obviated by an arrangement whereby the health department would make prior inspections of housing before occupancy and indicate to the welfare officials whether or not sanitary facilities are adequate and the structures suitable. There is similar need for a satisfactory relationship between the health department and the local agency handling properties held for tax sales and also with the Home Owners Loan Corporation, the latter being the most frequently encountered owner of properties in distress. Since the health department cannot readily bring its police power to bear upon another agency of government, prompt abatement of sanitary violations depends upon that mutual respect and coöperation which should exist among responsible government officials.

Housing, in its larger aspects, becomes community planning, the newest function of municipal government. The actual application of planning as an expression of a broad and sweeping public interest looking far into the future must necessarily trample upon many private interests. The deliberate, long range shaping of urban growth requires the merging and adjustment of many diverse interests among which public health and sanitation must be included. The health department has or should have a minimum of political inhibitions and its contribution to planning should be freer and bolder than that of some other interests normally making up the planning group. The engineer of the health department, whose job it is to think more or less continuously about the environment in terms of evolving comfort and cleanliness should, therefore, be a member of such a board or of an authoritative advisory group.

Another variety of sanitary problems is encountered in our factories and mercantile establishments where basic sani-

tation and industrial hazards both require attention. In New York State, industrial hygiene is divorced from public health at the state level and local health departments find it difficult to contribute to industrial sanitation without the appearance of intrusion upon another department's responsibilities. However, where such responsibilities are not being effectively discharged and where inspection is perfunctorily performed by non-technical personnel, there seems to be occasion for local health departments having engineering personnel to deal with factory sanitation and industrial hygiene under the public health police power. Again the lack of technical personnel in the local health department or in the state agency concerned with industrial hygiene is a barrier to effective coöperation on a common problem. Furthermore, coöperation with health departments involves the risk of making clearer the fact that industrial hygiene is a function more properly in the field of public health than of labor.

Another local agency having important influence upon the environment is the building department and its related zoning board. Their dealings with many structures and uses such as factories, apartment dwellings, nursing and boarding homes, food selling places and places of public assembly, and so-called offensive trades, affect interest of the health department, and there are always the common concerns with water supply, plumbing, sewage disposal, lighting, ventilation, and prevention of nuisances. The zoning and building authority can give and derive much assistance from the health department, provided the latter has the technical personnel to express the public health view of these matters.

The regulation of plumbing, which is properly a function of the building department, is one which benefits from a positive health department interest.

However, too often the preparation of a plumbing code and the indirect control of its enforcement is turned over to local plumbers, thereby placing the public interest, the only valid basis for such exercise of police power, at the mercy of a private interest, usually both selfish and unenlightened. The influence of an official public health engineer in the community can do much in bringing about a representation of the public interest, in modernizing the regulations with respect to private sewage disposal, cross-connections, back-siphonage protection, etc.

Currently the war effort has placed new or greatly expanded military establishments within many health jurisdictions and has thereby afforded opportunities for health department personnel to render valuable but not always appreciated assistance. A rapidly expanding military post creates problems of sanitation which may not be dealt with as rationally as observant local officials would like. The sudden authority which comes to military personnel not fully prepared for such responsibilities frequently results in arbitrary action based on personal prejudices. The assumption in the army organization that veterinarians are inherently qualified to assume responsibility for milk sanitation, meat inspection and food control, that physicians are epidemiologists and that engineer officers can cope with all sanitary problems, is too frequently disproved. The writer has observed the rapid expansion

of a regular army post in the course of which county health department personnel have had opportunities to assist army authorities in matters of water supply, sewage disposal, garbage and refuse disposal, food and milk sanitation, water main disinfection, and epidemiological investigations, in addition to the usual work of the health authority in the surrounding areas.

In concluding this review, its minor theme, which has no doubt become apparent, might be more explicitly stated as—the usefulness of the public health engineer in representing and extending the influence of the local health department. It is an invitation to the local health officer, now without such administrative and technical assistance, to consider the manifold ways in which his authority and service to the community may be expanded and strengthened. The activities here reviewed are so essential in the functioning of the larger municipal and county health jurisdictions that the local health officer, in failing to provide both the direct and indirect services of the public health engineer, is, in effect, inviting other agencies of government to meet the need. The local health department cannot afford to default on environmental sanitation if it is to assume its proper responsibilities in the service of the community.

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Tetanus Toxoid, Its Use in the United States Army*

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IN 1924, Descomby¹ produced tetanus toxoid by the application of the technic Ramon² had described for the removal of the toxic properties from diphtheria toxin. Later, Ramon and Zoeller,³ having demonstrated its antigenic value, suggested the use of tetanus toxoid as an agent for active immunization against tetanus. Since that time, the value of this procedure has been demonstrated by many workers, and active immunization with tetanus toxoid has largely supplanted passive protection with antitoxin for the prevention of tetanus among battle casualties. Reports from the British and French Armies have indicated its efficacy under actual battle conditions, as has the experience of our own troops in combat zones.

THE PRESENT PROGRAM

Plans for the active immunization against tetanus of American troops were made early in 1940, and in the fore part of 1941 the procedure was adopted as routine for all military personnel on active duty.

The agent selected was fluid or plain tetanus toxoid. The toxoids used by the U. S. Army are procured from commercial biological laboratories licensed

by the National Institute of Health for the production and sale of this material. The toxins which are converted into toxoids are produced in infusion broth media fortified by various types of peptones or meat digests. These toxoids must conform in all respects to the requirements of the Biologics Control Division of the National Institute. To meet these requirements, the original toxin must have a potency of at least 10,000 guinea pig m.l.d. per ml., and be detoxified by the addition of not more than 0.4 per cent of formalin. The toxoid so produced must be shown to be completely atoxic for guinea pigs when injected subcutaneously in doses of 5 ml. The retention of specific antigenicity is demonstrated by the subcutaneous injection of 1 ml. of the toxoid into each of a group of guinea pigs. At least 80 per cent of the animals so prepared must show complete protection against 10 m.l.d. of toxin administered 6 weeks later. In addition to these and the other requirements of the National Institute of Health, the toxoid used by the Army is subjected to certain additional safety tests prior to its distribution.

The decision to employ fluid rather than alum-precipitated toxoid was not entirely an arbitrary one. This decision was based in large part on the satisfactory experience of the British and French with the use of a fluid prepara-

* Presented before a Joint Session of the Health Officers, Laboratory, and Epidemiology Sections of the American Public Health Association at the Seventy-First Annual Meeting in St. Louis, Mo., October 27, 1942.

tion. The relative infrequency of reactions attending the administration of this form of toxoid and the evidence at hand attesting to its efficacy were thought to constitute a sound basis for its adoption.

In the consideration of the use of alum-precipitated toxoid, its antigenic properties were well appreciated. However, the use of such precipitates had been limited for the most part to the administration of alum diphtheria toxoid to children. This lack of experience with precipitated toxoids in adults, and the knowledge that the addition of alum to an antigen in many instances tends to increase its sensitizing action, were additional factors influencing the choice of the type of toxoid.

The use of toxoid for the development of adequate protection against tetanus involves the establishment of a basic active immunity and the subsequent reinforcement of this immunity by the administration of stimulating, or booster, doses. Such a procedure is currently followed in the Army.

As soon as possible after entrance upon active duty, all military personnel are given a series of three subcutaneous injections of tetanus toxoid. The doses are 1 ml. each and are administered at intervals of 3 weeks. Under ordinary circumstances, a single stimulating dose of 1 ml. of the toxoid is administered at the end of one year after the initial series. As an added safeguard, a single stimulating dose of 1 ml. is administered during the month prior to departure for a theater of operations, unless such departure is within the 6 months period subsequent to the administration of a previous dose. The completion of the initial series and the administration of the first stimulating dose are recorded on the individual's metal identification tag, as well as in his personal immunization record.

An emergency stimulating dose of toxoid is administered upon the incur-

rence of wounds or severe burns on the battlefield, at the time of secondary operations or manipulations of old wounds, or at any other time when danger from tetanus is considered to be a possibility. Antitoxin is not administered for prophylaxis unless there is reason to doubt that the individual in question had previously received at least the initial series of toxoid injections. If such a doubt does exist, a prophylactic dose of tetanus antitoxin is administered and active immunization with toxoid is initiated at the same time.

REACTIONS

While the administration of tetanus toxoid has been attended by some reactions, particularly early in the program, these have not constituted a major problem and have not seriously hampered the practice of active immunization.

The reactions encountered may be classified into two main categories. Those in the first category have caused no concern and are manifested by such symptoms as headache, weakness, general malaise, local soreness of the arm, and occasionally chills and fever. Such reactions are not unlike those occurring following typhoid vaccination. However, these reactions apparently occur with less frequency after the administration of tetanus toxoid than following the injection of triple typhoid vaccine.

The second category of reactions is made up of those occurring, in the majority of instances, within 30 minutes after the injection. They are characterized in general by flushing and itching of the skin, local and generalized urticarial eruptions, and edema of the lips and eyelids. Occasional instances of edema of the glottis and dyspnea have been observed. These reactions, like those described above, have not been encountered with any great frequency. The reported incidence during the early part of the immunization program was about 0.05 per cent of injections, or

about one such reaction in every 2,000 injections. This incidence has now decreased markedly, for reasons which will be brought out later.

The nature of these reactions, rather than their frequency, stimulated considerable interest in them and their cause. It became apparent very soon that they were manifestations of sensitivity to some constituent of the toxoids being used. This was confirmed in several instances by the exhibition of typical skin reactions of sensitivity to the intradermal injection of 0.1 ml. of a 1:100 dilution of the toxoid which had been administered just prior to the reaction. At the same time, several individuals, who had exhibited reactions not attributed to sensitivity, responded negatively to similar tests. Approximately 85 per cent of the reactions of sensitivity occurred after the second or third injection, indicating that at least a portion of the reactors had been sensitized by a previous dose of toxoid.

In view of the observations of Whittingham,⁴ Parish and Oakley,⁵ and Cooke and his associates,⁶ the reports of reactions were analyzed to determine whether or not there seemed to be any connection between the number of reactions reported and the type of peptone contained in the toxoid. This analysis indicated that those toxoids containing Witte or Berna peptones were responsible for the large majority of the reactions. From data collected early in the program, it appeared that the proportion of reactions of sensitivity following the injection of these toxoids was at least six times that following the use of toxoids free from these particular peptones.

As a result of these findings, the procurement and distribution of tetanus toxoid containing Witte or Berna peptones were discontinued. As indicated above, the incidence of reactions of sensitivity has fallen sharply since that time. The exact proportion of such re-

actions following the administration of the currently distributed toxoid is not known. At the present time, reports of such reactions are extremely rare and the reporting of the total number of injections administered tends to be incomplete in the absence of reactions. It is considered to be a reasonable estimate, however, that the frequency of these reactions is now less than one in 10,000 injections.

While this incidence is extremely low and gives rise to no real concern, it must be borne in mind that the toxoids in current use do contain certain peptones and other proteins which may be potential sensitizing agents. These toxoids do give rise to occasional primary reactions and have been shown to be capable of producing positive skin tests in individuals who have previously reacted in a sensitive manner to Witte and Berna peptone toxoids.

Shortly after the appearance of the reactions of sensitivity, it was suggested that tetanus toxoid produced on a simplified medium such as that reported in 1940 by Mueller and Miller⁷ might be utilized. Mueller⁸ has carried on intensive investigations along this line since that time, and has produced tetanus toxoid in his own laboratory, using a casein hydrolysate medium. Some of this toxoid has been used as skin test material in individuals known to be sensitive to Witte and Berna peptone toxoids. There were no positive reactions elicited, although, as indicated above, many of these same individuals did react positively to certain of the toxoids in current use. Some of the commercial laboratories have also worked on this problem, but they have not, as yet, made available satisfactory toxoids produced on the simplified medium. It is understood that these investigations are continuing, and it is hoped that toxoids produced in protein-free media or similar non-reaction producing media, can be made available.

RESULTS

Within the experience to the present time, the results following the use of toxoid in the manner described have been completely satisfactory. While no large-scale studies for the determination of blood antitoxin levels have been made, the antitoxin content of several small groups of blood sera has been determined.* One group was studied in relation to the length of time required to develop protection after the completion of the initial series of injections. Serum specimens were obtained from each of 9 individuals 1 week after the last injection of the initial series. At the same time, a fourth, or stimulating, dose of toxoid was administered in the same manner as if required by a potentially infected wound. A week after this fourth injection, additional serum specimens were obtained. All of the first specimens taken (1 week after the third dose) contained at least 0.1 unit of antitoxin per ml. and three contained 1.0 unit or more per ml. Of the sera taken 1 week after the fourth, or stimulating dose, two contained more than 0.1 unit, but less than 0.5 unit; three contained more than 0.5 unit, but less than 1.0 unit; and the remainder contained at least 2.0 units of antitoxin per ml. Since the amounts of circulating antitoxin necessary for protection have been stated by various workers to be 0.01 unit to 0.2 unit per ml. of serum,^{9, 10} it was considered reasonable to assume that there is adequate protection, based on active immunity, after the completion of the initial series of three injections of tetanus toxoid and that there is no indication for the use of prophylactic antitoxin after this immunity has been established. In this

respect, it would appear obvious that circulating antitoxin resulting from active immunization is potentially more significant immunologically than is that obtained as a result of passive immunization.

Serum specimens have also been obtained from individuals just before and 1 week after the administration of the stimulating dose given 1 year following the initial series. Sera collected in this manner have been found to contain 0.001 to 0.1 unit of antitoxin per ml. before the stimulating dose, and, in the majority of instances, more than 0.6 unit per ml.† 1 week after the stimulating dose. These titers correspond closely with those obtained under more or less similar circumstances by Sneath and Kerslake,¹¹ Lincoln and Greenwald,¹² Gold,¹³ and others.

Under ordinary conditions, the incidence of tetanus in the Army, as in the civil population of this country, is very low. Since June, 1941, when the present tetanus immunization program was adopted, there have been but 4 cases reported from the entire Army. None of these were in immunized individuals. It is of especial interest to note that no cases of tetanus have been reported from battle casualties. This may assume some significance when considered with the fact that other anaerobic infections have been reported from certain of the active theaters and that, in one of these areas at least, considerable potential danger from tetanus infection is known to exist.¹⁴

It is perhaps too early in the experience of the present war to draw any conclusions from the evidence at hand. However, it is believed that the present practice with respect to the prevention of tetanus among battle casualties affords our fighting forces a maximum of protection.

* The antitoxin determinations reported were performed by Benjamin T. Sockrider, at the National Institute of Health, Bethesda, Md., and the serum specimens were collected by various medical corps officers at the Army Medical School, the Washington General Dispensary, and elsewhere.

† The actual antitoxin content of many of these sera was not determined, since, in most instances, they were not tested for more than 0.6 unit per ml.

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Surveys of the Nutrition of Populations*

Description of the Population, General Methods and Procedures,
and the Findings in Respect to the Energy Principle (Calories)
in a Rural Population in Middle Tennessee

PART 2

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RESULTS

The mean calorie intakes according to age, sex, and race, together with related factors, are shown in Table 6 where they are compared with the recommended daily allowances of the Food and Nutrition Board of the National Research Council.† The age groups have been selected to correspond to those used in the recommendations. Subjects under

one year of age have been omitted from this and subsequent tables because many were breast fed, at least in part, and we were unsuccessful in determining accurately the calorie intake. Furthermore, the great variation in requirements month by month in this age period would necessitate separation at many points. With only about 2 per cent of subjects (25 individuals) in this entire

TABLE 6

Mean Calorie Intake and Related Factors According to Age, Sex, and Race.

| | 1-3 Yrs. M-F* | 4-6 Yrs. M-F | 7-9 Yrs. M-F | 10-12 Yrs. M-F | 13-15 Yrs. M | 13-15 Yrs. F | 16-20 Yrs. M | 16-20 Yrs. F | 21+ Yrs. M | 21+ Yrs. F |
|---|---------------------|--------------------|--------------------|----------------------|--------------------|--------------------|--------------------|--------------------|------------------|------------------|
| <i>White</i> | | | | | | | | | | |
| Number in Group | 36 | 43 | 66 | 50 | 19 | 18 | 34 | 29 | 193 | 214 |
| Mean Age, years | 2 | 5 | 8 | 11 | 14 | 14 | 18 | 18 | 45 | 42 |
| Mean Height, inches | 34 | 43 | 51 | 58 | 64 | 63 | 69 | 65 | 70 | 64 |
| Mean Intake, calories | 1,210 | 1,547 | 1,726 | 1,855 | 2,494 | 1,691 | 2,723 | 1,975 | 2,581 | 1,736 |
| Recommended allowances, calories † | 1,200 | 1,600 | 2,000 | 2,500 | 3,200 | 2,800 | 3,800 | 2,400 | 3,000 | 2,500 |
| Observed Mean Weight, lbs. | 28 | 41 | 55 | 76 | 107 | 98 | 143 | 117 | 157 | 139 |
| Expected Mean Weight for age and Height, ‡ lbs. | 27 | 41 | 61 | 84 | 113 | 112 | 149 | 126 | 170 | 138 |
| <i>Colored</i> | | | | | | | | | | |
| Number in Group | 33 | 24 | 23 | 31 | 15 | 14 | 20 | 25 | 94 | 89 |
| Mean Age, years | 2 | 5 | 8 | 11 | 15 | 14 | 18 | 18 | 44 | 44 |
| Mean Height, inches | 34 | 44 | 51 | 58 | 65 | 64 | 68 | 64 | 69 | 64 |
| Mean Intake, calories | 700 | 1,008 | 1,308 | 1,488 | 1,643 | 1,418 | 2,065 | 1,396 | 2,005 | 1,315 |
| Recommended allowances, calories † | 1,200 | 1,600 | 2,000 | 2,500 | 3,200 | 2,800 | 3,800 | 2,400 | 3,000 | 2,500 |
| Observed Mean Weight, lbs. | 27 | 42 | 56 | 80 | 110 | 110 | 152 | 129 | 152 | 145 |
| Expected Mean Weight for age and Height, ‡ lbs. | 27 | 43 | 61 | 85 | 120 | 117 | 143 | 123 | 163 | 138 |

* M = Male; F = Female

† Food and Nutrition Board, National Research Council

‡ Baldwin-Wood Tables

* The studies referred to herein were conducted under the auspices of the International Health Division of the Rockefeller Foundation of New York City by the Nutrition Unit of the Departments of Medicine and Biochemistry of the Vanderbilt University School of Medicine, Nashville, Tenn.

† Only the individual, three day record of intake has been utilized in this analysis. An analysis of the food intake as revealed by the week's inventory and purchase and a comparison of the latter with the individual intake records will be the subject of a later paper.

group the sub-groups would be so small that the data would have no statistical significance.

It will be observed that with the exception of the 1 through 6 year white subjects the mean calorie intakes in every instance were significantly less than the daily allowances of the Food and Nutrition Board. This deficit increases irregularly with increasing age

and is greater in the Negroes. The deficit ranges from 274 calories in the case of the 7-9 year male and female whites to a maximum of 1,735 calories in the 16-20 Negro males.

The distribution of the calorie intakes for race, age, and sex is shown in Table 7 together with the standard deviation and the standard error of the mean. If 1,250 calories be taken as the mini-

TABLE 7
*Distribution of Calorie Intakes According to Age, Sex, and Race**

| Calorie Intake | Number of Subjects | | | | | | | | | | Total |
|------------------------|--------------------|-------------|-------------|---------------|---------------|---------------|---------------|---------------|-------------|-------------|-------|
| | 1-3 Yrs. † | 4-6 Yrs. | 7-9 Yrs. | 10-12 Yrs. | 13-15 Yrs. | 13-15 Yrs. | 16-20 Yrs. | 16-20 Yrs. | 21+ Yrs. | 21+ Yrs. | |
| | M-F | M-F | M-F | M-F | M | F | M | F | M | F | |
| White | | | | | | | | | | | |
| <1,000 | 13 | 5 | 6 | 2 | 0 | 1 | 1 | 1 | 1 | 16 | 46 |
| 1,000-1,249 | 12 | 4 | 8 | 5 | 1 | 2 | 0 | 0 | 4 | 26 | 62 |
| 1,250-1,499 | 11 | 16 | 9 | 8 | 0 | 5 | 1 | 5 | 8 | 37 | 100 |
| 1,500-1,749 | 3 | 8 | 11 | 14 | 1 | 5 | 1 | 5 | 17 | 47 | 112 |
| 1,750-1,999 | 1 | 9 | 17 | 4 | 3 | 1 | 2 | 4 | 20 | 37 | 98 |
| 2,000-2,249 | 0 | 4 | 5 | 5 | 4 | 2 | 4 | 7 | 26 | 30 | 87 |
| 2,250-2,499 | 0 | 1 | 3 | 2 | 3 | 1 | 3 | 2 | 31 | 12 | 58 |
| 2,500-2,749 | 0 | 1 | 4 | 4 | 3 | 1 | 8 | 4 | 23 | 10 | 58 |
| 2,750-2,999 | 1 | 0 | 2 | 4 | 1 | 1 | 4 | 2 | 29 | 4 | 48 |
| 3,000-3,499 | 0 | 0 | 1 | 2 | 3 | 0 | 10 | 0 | 34 | 5 | 55 |
| 3,500+ | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 25 | 1 | 31 |
| Unknown | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 3 | 10 | 4 | 21 |
| Total | 41 | 48 | 66 | 51 | 21 | 19 | 40 | 33 | 228 | 229 | 776 |
| Mean Calories | 1,210 | 1,547 | 1,728 | 1,855 | 2,494 | 1,691 | 2,723 | 1,975 | 2,581 | 1,736 | 2,015 |
| Standard Error of Mean | 57.6 | 57.6 | 65.9 | 87.8 | 154.5 | 120.7 | 112.3 | 91 | 48.8 | 36.6 | 26.4 |
| Standard Deviation | 369 | 399 | 539 | 620 | 709 | 526 | 683 | 498 | 721 | 549 | 726 |
| Median | 1,157 | 1,485 | 1,739 | 1,679 | 2,375 | 1,575 | 2,703 | 2,000 | 2,522 | 1,678 | 1,897 |
| Colored | | | | | | | | | | | |
| <1,000 | 30 | 14 | 9 | 5 | 4 | 1 | 0 | 5 | 4 | 32 | 104 |
| 1,000-1,249 | 1 | 7 | 2 | 7 | 1 | 1 | 3 | 4 | 8 | 18 | 52 |
| 1,250-1,499 | 1 | 2 | 3 | 6 | 0 | 6 | 2 | 4 | 12 | 15 | 51 |
| 1,500-1,749 | 1 | 1 | 5 | 5 | 3 | 3 | 3 | 7 | 16 | 9 | 53 |
| 1,750-1,999 | 0 | 0 | 4 | 4 | 3 | 1 | 2 | 3 | 10 | 8 | 35 |
| 2,000-2,249 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 15 | 3 | 22 |
| 2,250-2,499 | 0 | 0 | 0 | 3 | 0 | 0 | 4 | 0 | 10 | 4 | 21 |
| 2,500-2,749 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 7 | 2 | 13 |
| 2,750-2,999 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 6 | 0 | 10 |
| 3,000-3,499 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 4 |
| 3,500+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 5 |
| Unknown | 1 | 0 | 2 | 0 | 1 | 2 | 1 | 0 | 3 | 5 | 15 |
| Total | 34 | 24 | 26 | 31 | 15 | 15 | 22 | 24 | 98 | 96 | 385 |
| Mean Calories | 700 | 1,008 | 1,308 | 1,488 | 1,643 | 1,418 | 2,066 | 1,396 | 2,005 | 1,315 | 1,519 |
| Standard Error of Mean | 49.8 | 62.1 | 88.2 | 90.4 | 230.6 | 91.4 | 143.5 | 76.6 | 71.7 | 49.4 | 33.3 |
| Standard Deviation | 287 | 304 | 450 | 504 | 863 | 342 | 658 | 375 | 699 | 471 | 641 |
| Median | 650 | 983 | 1,366 | 1,396 | 1,834 | 1,450 | 2,125 | 1,438 | 1,938 | 1,288 | 1,390 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

imum recommended intake for all ages over 1 year (the lowest recommended allowance of the Food and Nutrition Board for subjects over one year of age is 1,200 calories) 14.3 per cent of white subjects and 42.1 per cent of colored subjects, or 23.4 per cent of all subjects one year or older had intakes below the minimum. As might be expected, the highest incidence of failure to meet the recommended allowances, 75.6 per cent, was in the youngest group, (1-3 years), those whose recommended allowance is practically at the minimum level for the entire group. However, the second highest incidence, 29.1 per cent, is in the females 21 years and over. Divided into white and colored the figures are 61 and 93.9 and 18.6 and 54.9 per cent respectively. Because the table does not indicate the levels of intake below 1,000 it is impossible to determine completely the magnitude of the apparent deficit in the age group 1-3.

calculated from the recommended daily allowances of the Food and Nutrition Board. In many of the groups the ratios calculated from our data are quite similar to those calculated from the recommended allowances indicating that for those groups the proportionate distribution of food as concerns calories was usual though at a lower absolute level, compared with the recommended allowances. However, for certain groups a considerably lower ratio is found. These include males and females of 10-15, both sexes of the colored 16-20 year olds, and the white males of this same age group, as well as the females of 21+ of both races. In addition the Negro children 1-3 have a lower ratio. The tendency for the lower ratios to be most frequent in the age groups around puberty indicates a significant lack of correspondence between intake and the large allowances suggested for this period.

TABLE 8

Ratio of the Mean Calorie Intake of Various Age Groups to the Intake of Males of 21 Years and Over

| Age | Sex | Mean Calorie Intake and Ratios According to Recommended Allowances * | | Observed Intakes and Ratios | | | |
|-------|-----|--|-------|-----------------------------|-------|--------------------|-------|
| | | | | White | | Colored | |
| | | Intake Calories | Ratio | Intake Calories | Ratio | Intake Calories | Ratio |
| 1-3 | M-F | 1,200 | 0.40 | 1,210 | 0.468 | 700 | 0.354 |
| 4-6 | M-F | 1,600 | 0.53 | 1,547 | 0.599 | 1,008 | 0.504 |
| 7-9 | M-F | 2,000 | 0.67 | 1,726 | 0.668 | 1,308 | 0.652 |
| 10-12 | M-F | 2,500 | 0.88 | 1,855 | 0.718 | 1,488 | 0.742 |
| 13-15 | M | 3,200 | 1.07 | 2,494 | 0.963 | 1,643 | 0.819 |
| 13-15 | F | 2,800 | 0.93 | 1,691 | 0.651 | 1,418 | 0.707 |
| 16-20 | M | 3,800 | 1.27 | 2,723 | 1.050 | 2,065 | 1.030 |
| 16-20 | F | 2,400 | 0.80 | 1,975 | 0.765 | 1,396 | 0.696 |
| 21+ | M | 3,000 | 1.00 | 2,581 | 1.000 | 2,005 | 1.000 |
| 21+ | F | 2,400 | 0.88 | 1,736 | 0.673 | 1,315 | 0.655 |

* Food and Nutrition Board, National Research Council

Examination of the individual records however indicates that the deficit there is as severe as in the older ages.

In Table 8 the ratios of the mean calorie intake of the various age and sex groups to the intake of males over 21 are compared with similar ratios

The mean intake of carbohydrate in grams is shown in Table 9 distributed according to age, sex, and race, together with the carbohydrate intake expressed as calories and as per cent of total calories. The mean calories for each age, sex, and race group are given for

TABLE 9

Carbohydrate

*Distribution of Intake According to Age, Sex, and Race by Grams, as Calories and as Per cent of Total Calories, Together with Related Factors**

| Carbo- hydrate Intake | Number of Subjects | | | | | | | | | |
|-------------------------------|--------------------|-------|-------|-------|--------|-------|-------|-------|--------|-------|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 13-15 | 16-20 | 16-20 | 21+ | 21+ |
| | Yrs. † | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. |
| | M-F | M-F | M-F | M-F | M | F | M | F | M | F |
| <i>White</i> | | | | | | | | | | |
| <50 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 50-99 | 3 | 1 | 3 | 0 | 0 | 0 | 0 | 1 | 0 | 2 |
| 100-149 | 20 | 8 | 4 | 3 | 1 | 3 | 2 | 0 | 8 | 24 |
| 150-199 | 14 | 15 | 20 | 10 | 0 | 2 | 0 | 5 | 12 | 52 |
| 200-249 | 1 | 18 | 15 | 14 | 4 | 7 | 1 | 10 | 17 | 54 |
| 250-299 | 1 | 5 | 13 | 10 | 6 | 2 | 7 | 9 | 51 | 52 |
| 300-349 | 0 | 0 | 6 | 7 | 3 | 3 | 7 | 4 | 39 | 25 |
| 350-399 | 0 | 1 | 1 | 4 | 1 | 2 | 9 | 0 | 38 | 7 |
| 400-499 | 0 | 0 | 3 | 1 | 5 | 0 | 8 | 1 | 34 | 6 |
| 500-549 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 5 | 0 |
| 550+ | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 13 | 2 |
| Unknown | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 3 | 10 | 4 |
| Total | 41 | 48 | 66 | 51 | 21 | 19 | 40 | 33 | 228 | 229 |
| Mean Intake, Grams | 140 | 198 | 233 | 256 | 326 | 241 | 344 | 248 | 336 | 237 |
| Standard Error of Mean | 7.16 | 7.79 | 11.03 | 11.56 | 26.30 | 17.99 | 17.34 | 12.15 | 7.38 | 5.44 |
| Standard Deviation | 45.85 | 54.0 | 90.25 | 81.75 | 120.55 | 78.4 | 105.5 | 66.55 | 108.95 | 81.7 |
| Median (Grams) | 139 | 200 | 219 | 243 | 296 | 232 | 353 | 245 | 326 | 231 |
| CHO as Calories | 560 | 792 | 932 | 1,024 | 1,304 | 964 | 1,376 | 992 | 1,344 | 948 |
| CHO as Per cent of Total Cal. | 46.3 | 51.2 | 53.9 | 55.2 | 52.3 | 57.0 | 50.5 | 50.2 | 52.1 | 54.6 |
| Mean Total Calories | 1,210 | 1,547 | 1,726 | 1,855 | 2,494 | 1,691 | 2,723 | 1,975 | 2,581 | 1,736 |
| <i>Colored</i> | | | | | | | | | | |
| <50 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 50-99 | 19 | 3 | 2 | 0 | 2 | 1 | 0 | 4 | 1 | 12 |
| 100-149 | 10 | 7 | 7 | 5 | 1 | 0 | 3 | 3 | 2 | 25 |
| 150-199 | 2 | 11 | 3 | 8 | 2 | 4 | 2 | 3 | 17 | 23 |
| 200-249 | 1 | 2 | 6 | 7 | 2 | 5 | 5 | 10 | 21 | 15 |
| 250-299 | 0 | 1 | 3 | 3 | 4 | 1 | 2 | 3 | 15 | 8 |
| 300-349 | 0 | 0 | 3 | 3 | 0 | 1 | 2 | 1 | 13 | 5 |
| 350-399 | 0 | 0 | 0 | 4 | 1 | 0 | 3 | 0 | 10 | 1 |
| 400-499 | 0 | 0 | 0 | 1 | 2 | 1 | 4 | 0 | 13 | 2 |
| 500-549 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| 550+ | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| Unknown | 1 | 0 | 2 | 0 | 1 | 2 | 1 | 0 | 3 | 5 |
| Total | 34 | 24 | 26 | 31 | 15 | 15 | 22 | 24 | 98 | 96 |
| Mean Intake, Grams | 100 | 156 | 198 | 237 | 251 | 192 | 285 | 193 | 291 | 181 |
| Standard Error of Mean | 6.56 | 10.41 | 14.1 | 15.92 | 32.34 | 20.92 | 28.0 | 14.87 | 10.68 | 8.45 |
| Standard Deviation | 37.67 | 50.98 | 71.88 | 88.65 | 121.0 | 78.30 | 128.3 | 71.3 | 104.2 | 81.0 |
| Median (Grams) | 91 | 169 | 200 | 218 | 275 | 175 | 263 | 213 | 272 | 167 |
| CHO as Calories | 400 | 624 | 792 | 948 | 1,004 | 768 | 1,140 | 772 | 1,164 | 724 |
| CHO as Per cent of Total Cal. | 57.1 | 61.9 | 60.6 | 63.7 | 61.1 | 54.2 | 55.2 | 55.3 | 58.1 | 55.1 |
| Mean Total Calories | 700 | 1,008 | 1,308 | 1,488 | 1,643 | 1,418 | 2,065 | 1,396 | 2,005 | 1,315 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

TABLE 10

Fat

*Distribution of Intake According to Age, Sex, and Race by Grams, as Calories and as Per cent of Total Calories; with Related Factors **

| Fat Intake Grams | Number of Subjects | | | | | | | | | |
|-------------------------------|--------------------|----------|----------|------------|------------|------------|------------|------------|----------|----------|
| | 1-3 Yrs. † | 4-6 Yrs. | 7-9 Yrs. | 10-12 Yrs. | 13-15 Yrs. | 13-15 Yrs. | 16-20 Yrs. | 16-20 Yrs. | 21+ Yrs. | 21+ Yrs. |
| | M-F | M-F | M-F | M-F | M | F | M | F | M | F |
| <i>White</i> | | | | | | | | | | |
| <25 | 6 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 1 | 5 |
| 25- 49 | 19 | 10 | 13 | 11 | 0 | 5 | 1 | 5 | 11 | 52 |
| 50- 59 | 7 | 13 | 9 | 10 | 3 | 4 | 3 | 2 | 5 | 37 |
| 60- 69 | 4 | 10 | 9 | 7 | 3 | 5 | 2 | 4 | 21 | 44 |
| 70- 79 | 4 | 8 | 12 | 5 | 1 | 3 | 0 | 9 | 24 | 36 |
| 80- 89 | 0 | 3 | 9 | 4 | 2 | 0 | 3 | 3 | 26 | 18 |
| 90- 99 | 1 | 0 | 4 | 3 | 3 | 0 | 4 | 2 | 19 | 5 |
| 100-109 | 0 | 2 | 4 | 4 | 2 | 1 | 8 | 2 | 21 | 10 |
| 110-124 | 0 | 0 | 2 | 4 | 2 | 0 | 4 | 1 | 33 | 11 |
| 125-149 | 0 | 1 | 1 | 1 | 2 | 0 | 9 | 2 | 27 | 3 |
| 150+ | 0 | 0 | 1 | 1 | 3 | 0 | 3 | 0 | 30 | 4 |
| Unknown | 0 | 0 | 0 | 1 | 0 | 1 | 3 | 3 | 10 | 4 |
| Total | 41 | 48 | 66 | 51 | 21 | 19 | 40 | 33 | 228 | 229 |
| Mean Intake, Grams | 45 | 62 | 70 | 72 | 99 | 56 | 108 | 78 | 103 | 67 |
| Standard Error of Mean | 3.07 | 3.05 | 3.30 | 4.14 | 7.6 | 4.56 | 5.03 | 4.76 | 1.88 | 1.4 |
| Standard Deviation | 19.6 | 21.17 | 27.05 | 29.3 | 34.8 | 19.9 | 30.7 | 26.1 | 26.6 | 21.1 |
| Median | 33 | 60 | 70 | 66 | 95 | 66 | 108 | 74 | 101 | 64 |
| Fat as Calories | 405 | 558 | 630 | 648 | 891 | 504 | 972 | 702 | 927 | 603 |
| Fat as Per cent of Total Cal. | 33.5 | 36.1 | 36.5 | 34.9 | 35.7 | 29.8 | 35.7 | 35.5 | 35.9 | 34.7 |
| Mean Total Calories | 1,210 | 1,547 | 1,726 | 1,855 | 2,494 | 1,691 | 2,723 | 1,975 | 2,581 | 1,736 |
| <i>Colored</i> | | | | | | | | | | |
| <25 | 17 | 9 | 4 | 2 | 2 | 0 | 0 | 2 | 0 | 12 |
| 25- 49 | 15 | 15 | 11 | 16 | 5 | 6 | 5 | 10 | 19 | 52 |
| 50- 59 | 0 | 0 | 4 | 4 | 2 | 4 | 3 | 4 | 12 | 9 |
| 60- 69 | 1 | 0 | 4 | 5 | 1 | 2 | 3 | 6 | 14 | 10 |
| 70- 79 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 19 | 4 |
| 80- 89 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 10 | 3 |
| 90- 99 | 0 | 0 | 0 | 0 | 3 | 1 | 2 | 0 | 13 | 1 |
| 100-109 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 3 | 0 |
| 110-124 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |
| 125-149 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 0 |
| 150+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unknown | 1 | 0 | 2 | 0 | 1 | 2 | 1 | 0 | 3 | 5 |
| Total | 34 | 24 | 26 | 31 | 15 | 15 | 22 | 24 | 98 | 96 |
| Mean Intake, Grams | 24 | 31 | 44 | 49 | 59 | 51.0 | 71 | 49 | 71 | 43 |
| Standard Error of Mean | 1.95 | 2.29 | 3.55 | 3.78 | 8.98 | 3.93 | 5.72 | 3.63 | 2.56 | 1.94 |
| Standard Deviation | 11.2 | 11.2 | 18.1 | 21.08 | 33.6 | 14.7 | 26.2 | 17.45 | 24.9 | 18.4 |
| Median | 23 | 30 | 44 | 43 | 50 | 48 | 68 | 50 | 71 | 31 |
| Fat as Calories | 216 | 279 | 396 | 441 | 531 | 459 | 639 | 441 | 639 | 387 |
| Fat as Per cent of Total Cal. | 30.9 | 27.7 | 30.3 | 29.6 | 32.3 | 32.4 | 30.9 | 31.6 | 31.9 | 29.4 |
| Mean Total Calories | 700 | 1,008 | 1,308 | 1,488 | 1,643 | 1,418 | 2,066 | 1,396 | 2,005 | 1,315 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

TABLE 11

Protein

*Distribution of Intake According to Age, Sex, and Race by Grams, as Calories and as Per cent of Total Calories; with Related Factors**

| Protein Intake | Number of Subjects | | | | | | | | | | Total |
|---------------------------------------|--------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 13-15 | 16-20 | 16-20 | 21+ | 21+ | |
| | Yrs. † | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | |
| Grams | M-F | M-F | M-F | M-F | M | F | M | F | M | F | |
| <i>White</i> | | | | | | | | | | | |
| <25 | 8 | 2 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 18 |
| 25- 49 | 26 | 24 | 24 | 19 | 2 | 11 | 1 | 7 | 19 | 96 | 227 |
| 50- 59 | 2 | 10 | 13 | 12 | 3 | 5 | 2 | 5 | 31 | 50 | 133 |
| 60- 69 | 1 | 7 | 15 | 4 | 2 | 1 | 6 | 7 | 28 | 37 | 108 |
| 70- 79 | 3 | 4 | 8 | 6 | 1 | 2 | 6 | 8 | 35 | 15 | 88 |
| 80- 89 | 1 | 0 | 2 | 4 | 8 | 0 | 6 | 0 | 30 | 16 | 67 |
| 90- 99 | 0 | 1 | 0 | 2 | 1 | 0 | 7 | 1 | 24 | 2 | 38 |
| 100-109 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 1 | 22 | 4 | 32 |
| 110-124 | 0 | 0 | 1 | 2 | 1 | 0 | 3 | 0 | 10 | 1 | 18 |
| 125+ | 0 | 0 | 1 | 0 | 3 | 0 | 2 | 0 | 19 | 1 | 26 |
| Unknown | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 3 | 10 | 4 | 22 |
| Total | 41 | 48 | 66 | 51 | 21 | 19 | 40 | 33 | 228 | 229 | 776 |
| Mean Intake, Grams | 38 | 47 | 56 | 57 | 83 | 48 | 87 | 60 | 82 | 56 | 64 |
| Standard Error of Mean | 3.29 | 2.45 | 2.66 | 3.16 | 6.46 | 3.06 | 3.62 | 3.52 | 1.82 | 1.26 | 0.97 |
| Standard Deviation | 21.1 | 16.9 | 21.8 | 22.7 | 29.6 | 13.3 | 22.0 | 19.3 | 26.9 | 18.9 | 26.7 |
| Median | 30 | 34 | 56 | 52 | 83 | 46 | 86 | 63 | 79 | 53 | 60 |
| Protein as Calories | 152 | 188 | 224 | 228 | 332 | 192 | 348 | 240 | 328 | 224 | 256 |
| Protein as Per cent of Total Calories | 12.6 | 12.2 | 13.0 | 12.3 | 13.3 | 11.4 | 12.8 | 12.2 | 12.7 | 12.9 | 12.7 |
| Mean Total Calories | 1,210 | 1,547 | 1,726 | 1,855 | 2,494 | 1,696 | 2,723 | 1,975 | 2,581 | 1,736 | 2,015 |
| <i>Colored</i> | | | | | | | | | | | |
| <25 | 20 | 7 | 3 | 2 | 2 | 0 | 0 | 1 | 1 | 12 | 48 |
| 25- 49 | 12 | 15 | 18 | 17 | 3 | 11 | 5 | 14 | 25 | 51 | 171 |
| 50- 59 | 1 | 1 | 1 | 4 | 1 | 1 | 3 | 5 | 18 | 15 | 50 |
| 60- 69 | 0 | 1 | 2 | 3 | 3 | 1 | 4 | 3 | 15 | 7 | 39 |
| 70- 79 | 0 | 0 | 0 | 3 | 0 | 0 | 7 | 1 | 12 | 4 | 27 |
| 80- 89 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 10 | 2 | 17 |
| 90- 99 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 7 | 0 | 8 |
| 100-109 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 0 | 7 |
| 110-124 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 125+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| Unknown | 1 | 0 | 2 | 0 | 1 | 2 | 1 | 0 | 3 | 5 | 15 |
| Total | 34 | 24 | 26 | 31 | 15 | 15 | 22 | 24 | 98 | 96 | 385 |
| Mean Intake, Grams | 23 | 33 | 38 | 48 | 60 | 44 | 64 | 44 | 65 | 42 | 48 |
| Standard Error of Mean | 2.13 | 2.71 | 2.47 | 3.27 | 8.88 | 2.54 | 4.15 | 3.04 | 2.47 | 1.78 | 1.93 |
| Standard Deviation | 12.2 | 13.25 | 12.60 | 18.03 | 33.2 | 9.50 | 19.0 | 14.6 | 24.0 | 16.9 | 23.0 |
| Median | 22 | 31 | 37 | 33 | 55 | 32 | 66 | 44 | 62 | 32 | 33 |
| Protein as Calories | 92 | 132 | 152 | 192 | 240 | 176 | 256 | 176 | 260 | 168 | 192 |
| Protein as Per cent of Total Calories | 13.1 | 13.1 | 11.6 | 12.9 | 14.6 | 12.4 | 12.4 | 12.6 | 13.0 | 12.8 | 12.6 |
| Mean Total Calories | 700 | 1,008 | 1,308 | 1,488 | 1,643 | 1,418 | 2,066 | 1,396 | 2,005 | 1,315 | 1,519 |

* 25 Children under one year of age have been omitted.

† M = Male; F = Female

comparison. In Tables 10 and 11 the same data are given for fat and for total protein.

The distribution of the various nutritive principles with respect to all of these factors is distinctly abnormal in certain age groups, and there the standard deviations may not have their usual significance. For this reason the actual distributions are given, and in Table 12 the quartile distribution is also given.

The only practical objective evidence

of the adequacy or deficiency of calories is the body weight which can be measured or can be estimated on the physical examination. The latter is based largely on an estimation of the amount of subcutaneous tissue in relation to the size, age, sex, and constitution of the individual. This can be supported by a statement regarding a tendency to overweight or underweight and a history of recent loss or gain in weight from the medical history. None of the latter two

TABLE 12
The Distribution of Caloric, Carbohydrate, Total Protein, and Fat Intake
According to Quartiles

| | Intake | | | | | | | | | | |
|------------------------|--------------------|--------------------|--------------------|----------------------|--------------------|--------------------|--------------------|--------------------|------------------|------------------|-------|
| | 1-3 Yrs. M-F | 4-6 Yrs. M-F | 7-9 Yrs. M-F | 10-12 Yrs. M-F | 13-15 Yrs. M | 13-15 Yrs. F | 16-20 Yrs. M | 16-20 Yrs. F | 21+ Yrs. M | 21+ Yrs. F | Total |
| Calories | | | | | | | | | | | |
| White | | | | | | | | | | | |
| 1st Quartile | 947 | 1,297 | 1,326 | 1,422 | 2,016 | 1,338 | 2,271 | 1,575 | 2,043 | 1,344 | 1,453 |
| 2nd " | 1,156 | 1,484 | 1,739 | 1,679 | 2,370 | 1,575 | 2,703 | 2,000 | 2,522 | 1,678 | 1,896 |
| 3rd " | 1,381 | 1,833 | 1,976 | 2,225 | 2,938 | 2,031 | 3,088 | 2,313 | 2,789 | 2,048 | 2,513 |
| Colored | | | | | | | | | | | |
| 1st Quartile | 521 | 800 | 857 | 1,098 | 917 | 950 | 1,521 | 1,063 | 1,495 | 928 | 971 |
| 2nd " | 650 | 983 | 1,367 | 1,296 | 1,667 | 1,450 | 2,125 | 1,438 | 1,938 | 1,188 | 1,390 |
| 3rd " | 844 | 1,200 | 1,650 | 1,716 | 1,958 | 1,550 | 2,563 | 1,679 | 2,406 | 1,590 | 1,873 |
| Carbohydrate (Grams) | | | | | | | | | | | |
| White | | | | | | | | | | | |
| 1st Quartile | 113 | 160 | 173 | 147 | 252 | 194 | 288 | 208 | 266 | 178 | 189 |
| 2nd " | 139 | 200 | 218 | 243 | 296 | 232 | 353 | 245 | 326 | 230 | 256 |
| 3rd " | 170 | 233 | 278 | 304 | 408 | 304 | 405 | 286 | 397 | 284 | 327 |
| Colored | | | | | | | | | | | |
| 1st Quartile | 76 | 117 | 134 | 167 | 163 | 156 | 203 | 122 | 209 | 121 | 138 |
| 2nd " | 91 | 156 | 200 | 218 | 263 | 200 | 263 | 213 | 272 | 167 | 201 |
| 3rd " | 117 | 175 | 247 | 304 | 296 | 241 | 379 | 241 | 361 | 227 | 275 |
| Total Proteins (Grams) | | | | | | | | | | | |
| White | | | | | | | | | | | |
| 1st Quartile | 27 | 35 | 40 | 40 | 61 | 41 | 70 | 48 | 62 | 39 | 44 |
| 2nd " | 37 | 48 | 56 | 54 | 83 | 46 | 86 | 63 | 79 | 53 | 60 |
| 3rd " | 47 | 60 | 68 | 73 | 90 | 66 | 100 | 73 | 99 | 65 | 79 |
| Colored | | | | | | | | | | | |
| 1st Quartile | 15 | 23 | 29 | 33 | 42 | 33 | 51 | 31 | 48 | 30 | 32 |
| 2nd " | 22 | 31 | 37 | 45 | 55 | 43 | 66 | 44 | 62 | 40 | 45 |
| 3rd " | 31 | 38 | 47 | 61 | 83 | 49 | 75 | 57 | 80 | 54 | 62 |
| Fat (Grams) | | | | | | | | | | | |
| White | | | | | | | | | | | |
| 1st Quartile | 31 | 51 | 52 | 52 | 68 | 43 | 91 | 61 | 76 | 50 | 53 |
| 2nd " | 44 | 60 | 70 | 66 | 95 | 56 | 107 | 74 | 110 | 64 | 73 |
| 3rd " | 58 | 73 | 85 | 92 | 123 | 68 | 134 | 88 | 127 | 79 | 102 |
| Colored | | | | | | | | | | | |
| 1st Quartile | 16 | 23 | 27 | 34 | 35 | 41 | 51 | 34 | 54 | 30 | 32 |
| 2nd " | 23 | 30 | 42 | 46 | 50 | 48 | 68 | 50 | 62 | 41 | 47 |
| 3rd " | 31 | 42 | 54 | 63 | 92 | 58 | 94 | 62 | 87 | 55 | 67 |

procedures are usually considered reliable in the assessment of nutrition. They are gross measures of nutrition in respect to calories, and although valuable in clinical practice are not generally considered reliable in the mass study of nutrition. We have included them, however, because the history of weight and changes in weight support other measures of energy nutrition and because the estimate of the subcutaneous tissue is the only objective measure of this same factor other than the weight of the subject, and, in children, certain other anthropometric measurements.

The lack of helpfulness of the history is shown by the results. Only 4 subjects gave a history of a tendency to obesity (1 colored adult female and 3 white adult females), and only 4 a history of a tendency to underweight (1 white male, 2 female adults and 1 colored girl in the age group 16-20). This despite the disclosure by examination and body weights of much obesity and underweight which had obviously existed a considerable time. Similarly only 8 subjects gave a history of abnormal recent loss of weight (3 white male adults, 1 white female adult, 1 colored man, and 3 colored women). *Only 1 colored subject* (female 16-20) gave a history of an abnormal increase. One white child (7-9), one white male (16-20), and a white woman reported an increase.

The estimate of the amount of subcu-

taneous tissue, however, proved surprisingly accurate in the cases in which a decrease was diagnosed. This diagnosis was made in about 10 per cent of the subjects. An abnormal decrease in subcutaneous tissue was noted in 99 of the subjects, and comparison of the actual recorded weights with the standard predicted weight for age, sex, and height showed a significant underweight in all but 5. Thus, the clinician's estimate of underweight was accurate in 95 of the 99 in which he made that diagnosis. However, many other subjects who were under their predicted weight were not so diagnosed by the examiner.

Analysis of the estimates of overweight and underweight from the amount of subcutaneous tissue (Table 13) shows that the findings conform in general to the abnormalities in mean weight shown in Table 6. In Table 13 what appears to be a significant sex difference should be noted. Of the 36 white males aged 13 or over, only 15 were adjudged overweight while 21 were thought to be underweight. Of the 86 white women of the same ages, 57 were judged overweight and only 29 underweight. The difference is even more striking in the Negroes. Five males were overweight and 8 underweight, while 33 females were overweight and only 6 underweight.

The weights of the subjects, which are the best objective measure of nutrition in respect to energy, are shown in

TABLE 13

Overweight and Underweight as Judged by the Clinical Estimate of the Subcutaneous Tissue

| Age Years | Sex | White | | Colored | |
|--------------|-----|-------------------|--------------------|-------------------|--------------------|
| | | Overweight No. | Underweight No. | Overweight No. | Underweight No. |
| 1-3 | M-F | 0 | 1 | 0 | 0 |
| 4-6 | M-F | 0 | 1 | 0 | 3 |
| 7-9 | M-F | 2 | 12 | 0 | 5 |
| 10-12 | M-F | 2 | 9 | 0 | 4 |
| 13-15 | M | 2 | 1 | 0 | 2 |
| 13-15 | F | 0 | 1 | 1 | 0 |
| 16-20 | M | 1 | 1 | 0 | 0 |
| 16-20 | F | 1 | 3 | 6 | 1 |
| 21+ | M | 12 | 19 | 5 | 6 |
| 21+ | F | 56 | 25 | 26 | 5 |

TABLE 14

*Distribution of Weights According to Age, Sex and Race **

| Weight | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 13-15 | 16-20 | 16-20 | 21+ | 21+ |
|-------------------------------|---------------|-------------|-------------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Yrs. † M-F | Yrs. M-F | Yrs. M-F | Yrs. M-F | Yrs. M | Yrs. F | Yrs. M | Yrs. F | Yrs. M | Yrs. F |
| White | | | | | | | | | | |
| Lowest Observed Weight | 15 | 28 | 41 | 48 | 66 | 67 | 104 | 85 | 101 | 100 |
| Mean Weight | 27 | 40 | 55 | 75 | 106 | 97 | 143 | 116 | 156 | 138 |
| Median Weight | 29 | 39 | 54 | 73 | 104 | 103 | 140 | 117 | 154 | 132 |
| Highest Observed Weight | 39 | 60 | 76 | 123 | 145 | 138 | 231 | 144 | 277 | 256 |
| Standard Error of Mean | 0.94 | 1.04 | 0.89 | 2.39 | 5.35 | 4.69 | 4.22 | 2.77 | 1.94 | 2.20 |
| Standard Deviation of Weights | 5.61 | 6.85 | 7.2 | 16.9 | 23.3 | 19.9 | 24.6 | 14.9 | 27.2 | 31.8 |
| Colored | | | | | | | | | | |
| Lowest Observed Weight | 17 | 28 | 41 | 59 | 81 | 85 | 133 | 87 | 113 | 87 |
| Mean Weight | 26 | 42 | 55 | 79 | 110 | 109 | 151 | 128 | 152 | 144 |
| Median Weight | 26 | 38 | 55 | 76 | 105 | 107 | 149 | 125 | 149 | 134 |
| Highest Observed Weight | 36 | 74 | 80 | 104 | 144 | 155 | 183 | 182 | 219 | 248 |
| Standard Error of Mean | 0.96 | 2.29 | 1.88 | 2.6 | 5.0 | 5.44 | 2.8 | 5.08 | 2.06 | 4.03 |
| Standard Deviation of Weights | 5.49 | 11.2 | 9.05 | 14.3 | 19.3 | 20.3 | 12.5 | 25.4 | 19.99 | 37.4 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

Tables 6 and 14. In Table 6 the observed mean weight is compared with the predicted weight for mean height and mean age of the various age, sex, and race groups. Table 14 gives the distribution according to age, sex, and race with the highest and lowest observed weights, mean and median weights in each group, and the standard deviations. As can be seen in Table 6, in 8 of the 20 groups the observed mean weight was significantly less than the predicted, the deficit ranging from 5 lb. in the 7-9 and 10-12 colored children, to 14 in the 13-15 white females. The children, white and colored, from 1-6 years of age, the women both white and colored 21 years and over, and colored males and females 16-20 had mean weights equal to or greater than the predicted.

Still one other method for detecting an inadequate calorie intake remains, the x-ray examination of the skeletal system of children for evidence of delay in growth and maturation. These changes are not specific; delay or arrest in growth and maturation occur with other nutritional deficiencies, perhaps even more strikingly, as well as with other disease. Hence, such evidence is of value in a negative way only; if no

interference with growth and maturation is found it is unlikely that nutritional deficiency, even a deficiency of calories of a significant degree, is present.

However, such abnormalities are measures of current nutrition only in earlier childhood when the developmental changes are sufficiently rapid to reflect current nutrition. Results of the x-ray will be reported later in analysis of all factors affecting the bones. Preliminary examination of the data shows little or no evidence of a deficiency of calories detected by this means.

Due to the extreme variability in the calorie requirements and the predicted weight of children less than one year of age, the data on this group are presented individually in Table 15. This group is composed of 11 white and 14 colored children ranging in age from 2 days through 11 months.

In the white group, 7 of the 11 children were partially or completely breast-fed. Since we were unable to quantitate this food, it is impossible to compare their calorie intakes with their needs. Only one child in this breast-fed group deviated strikingly from the predicted weight. This child was 4 lb. underweight in spite of the fact that, in addition to breast feedings, her accessory

TABLE 15

Calorie Intake and Weight of Children Less than One Year of Age

| Age | Sex | Observed Daily Caloric Intake | Predicted * Caloric Intake | Length inches | Observed Weight lbs. oz. | Predicted † Weight lbs. oz. | Nursing |
|----------|-----|--|----------------------------------|------------------|--------------------------------|-----------------------------------|---------|
| White | | | | | | | |
| 2 days | M | ... | 300 | 21 | ..... | 9 | yes |
| 1 month | M | ... | 360 | 26 | ..... | 13 | yes |
| 4 months | M | 15 | 700 | 26½ | 17 8 | 16 | yes |
| 4 " | M | ... | 700 | .. | 17 4 | .. | unknown |
| 5 " | M | 685 | 750 | 30 | 16 | 22 | no |
| 6 " | F | 703 | 790 | 28 | 18 | 19 | no |
| 6 " | F | 263 | 790 | 26¼ | 17 14 | 16 | yes |
| 7 " | F | 175 | 815 | 25½ | 16 8 | 16 | yes |
| 8 " | F | 901 | 840 | 29 | 16 | 20 | yes |
| 9 " | M | 500 | 860 | .. | .. | .. | unknown |
| 11 " | M | 350 | 900 | 27½ | 18 4 | 19 | yes |
| Colored | | | | | | | |
| 2 weeks | M | ... | 400 | 19¾ | 8 6 | 8 | unknown |
| 1 month | M | ... | 360 | 23½ | 12 | 11 8 | yes |
| 2 months | F | ... | 525 | 24 | 11 12 | 12 8 | yes |
| 2 " | M | ... | 525 | 22 | 11 | 10 8 | yes |
| 2 " | M | 808 | 525 | .. | ..... | ..... | no |
| 2 " | M | 600 | 525 | .. | ..... | ..... | yes |
| 2 " | F | ... | 525 | 22½ | 9 8 | 10 8 | yes |
| 2 " | M | 109 | 525 | 23½ | 12 8 | 11 8 | yes |
| 4 " | M | ... | 700 | 24½ | 16 | 14 | yes |
| 5 " | M | 33 | 750 | .. | 12 | ..... | yes |
| 5 " | F | ... | 750 | 24½ | 14 | 14 8 | unknown |
| 6 " | M | 82 | 790 | 25½ | 17 | 16 | yes |
| 8 " | M | 157 | 840 | 27 | 14 | 18 | yes |
| 11 " | F | 694 | 900 | 28 | 15 | 19 | no |

* From Holt and McIntosh, *Holt's Diseases of Infancy and Childhood*, D. Appleton-Century Co. Ed. 11, 1940.

† From table prepared by R. M. Woodbury for American Child Health Association.

feedings exceeded the calorie needs. Two individuals were not breast-fed, and both were receiving slightly less than their predicted calorie requirements (65 and 87 calorie deficit). One was found to be 6 lb. below the predicted weight and the other only 1 lb. below. The status of the 2 remaining white children is indefinite due to inadequate data.

Ten of the 14 colored children were known to be breast-fed. Of this group only one differed significantly from the predicted weight and was 4 lb. under this weight. Two children received no breast feedings. One received only 694 calories as compared to a predicted need of 900 calories. This individual was found to be 4 lb. underweight. The height and weight were not obtained on the other child who was not breast-fed. The complete dietary data on the re-

maining 2 colored children were not complete, but both were within 1 lb. of their predicted weight.

DISCUSSION

The data presented above seem to indicate a serious deficiency of calories (energy) in the diet of a large number of the population under study and the existence of a state of undernutrition in respect to this factor as disclosed by the body weight and the physical examination. All groups of the population except white children from 1 to 6 years of age were found by our records to have had a calorie intake significantly and often greatly below the recommended allowances of the Food and Nutrition Board. In certain groups the deficiency was as great as 45 per cent; only a little over half of the recommended number of calories daily were

consumed. These findings are supported by the existence of a significant degree of deficiency in the mean weights for many of the various groups of subjects and the finding of a considerable number of subjects with an abnormally small amount of subcutaneous tissue.

However, there are certain objections to a conclusion that there existed an undernutrition of this kind as frequent and as severe as appears from the data. In the first place, not all the groups had a less than predicted mean weight. Eight of the 20 groups had a mean weight equal to or greater than the predicted. Four of those groups were children, white and colored, 1-3 and 4-6. The others were colored males and females 16-20 and adult females of both races. Thus of these 8 groups, 5 were colored, the subjects who had the greatest apparent deficit of calories. Not only were the mean weights equal to predicted, but a very considerable number of the subjects were recorded as obese. Very few indeed reported losing weight or being underweight. Furthermore, it should be observed that the recorded calorie intakes in many instances are not only relatively but absolutely so low that their continuance for any but the shortest periods would seem inevitably to be followed by disabling loss of weight and strength. Many intakes are no greater than the content of reduction diets whose caloric value is calculated to be less than the basal requirements for "ideal" weight. Theoretically, on such diets the body weight should fall and the degree of activity be reduced until they reached levels which could be maintained by the energy supplied. On such diets as many of those indicated here, a disabling loss of weight and strength with a greatly limited activity would be expected. Yet, few if any of these subjects showed such symptoms, and many were not only of normal weight but were actually obese.

There are several possible explana-

tions for this apparent inconsistency. The food intake records may be inaccurate. The standards or accepted requirements with which the actual intakes are compared may be too high. The subjects may have been so inactive as to need little more than basal requirements. None of these explanations alone seems adequate though a combination of them may be. The records of food intake admittedly have a large margin of error. However, energy is one of the nutritive factors more easy to measure and calculate accurately. The calorie values of food have been well studied and quite accurately determined. Foods high in calories are in general easy to measure and record. It is likely that in a study of this size errors occur in both directions, over and under, and tend to cancel out. Furthermore, it is unlikely that they would consistently be large enough to explain the discrepancies found. Even an error of 20 per cent in one direction would still leave many subjects gravely inadequate in the intake of calories.

It is admitted that the recommended allowances are not intended to indicate the minimum but are those which are believed adequate and necessary for good nutrition on practical diets. Many other standards of requirements have been proposed, some of which call for somewhat smaller allowances of the various factors. The standards of the Food and Nutrition Board of the National Research Council have been based on the most recent evidence. In view of the inability to determine the actual minima under all circumstances, they might be taken as a reasonable standard, a divergence from the standard being interpreted in a relative and quantitative fashion. Yet, in view of the evidence disclosed in this study, it may be questioned whether the recommended allowances have not been placed too high. In this connection it is of interest to note that the over-all average intake

of calories in Milam's⁶ survey in North Carolina was 2,000 calories. Also, recent careful studies of the intake of a few individuals^{6,7} have disclosed intakes considerably below the usually recommended allowances unaccompanied by body weight below the calculated ideal and even associated with weights above that level. For instance, a normal man of 48, of more than moderate activity, was found to consume a daily diet of some 2,000 calories (in contrast to a recommended allowance of 3,000 calo-

ries). Yet, on this apparently low intake he had trouble avoiding an increase in his weight which was almost exactly at the calculated ideal.

Because of the discrepancy between recorded calorie intakes, recommended allowances and body weight, the relation between basal requirements, recorded intakes (calories), and the body weight in relation to predicted "ideal" weight, was investigated in a representative 10 per cent sample selected at random. This revealed that as many as a third

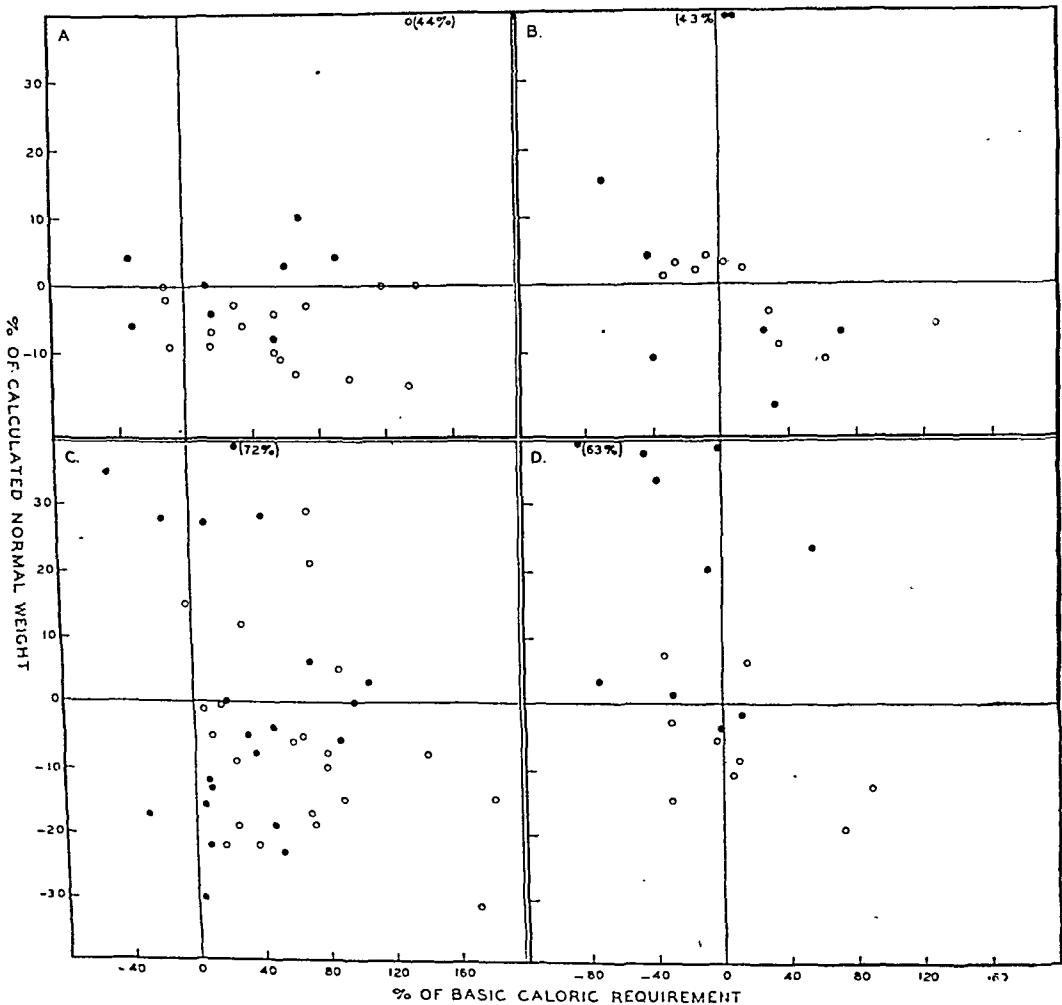


FIGURE 1—Graph showing the relation between calorie intake and weight of a representative sample selected at random (10 per cent). The horizontal axis represents calorie intake in per cent of basal requirements, the vertical axis the body weight in per cent of calculated "ideal" weight for height, sex and age. A. Children 1-9. Circles represent white; dots, colored subjects. B. Children 10-19. Circles represent white; dots, colored subjects. C. White adults 20 years and over, and D. Colored adults 20 years and over. Circles represent males; dots, females.

of the subjects recorded intakes less than 30 per cent above actual basal requirements as calculated on the basis of calories per square meter of body surface for age and sex. Several were below this basal requirement. Nevertheless, only a part of these subjects who were on such reduced intakes were as much as 20 per cent below their predicted "ideal" weight; many were over that weight, some by as much as 30 per cent. In Figure 1 these relationships are shown for each subject individually.

Perhaps, in view of the findings described above, the recommended allowances may have been based on a population more obese as a whole than is necessary or perhaps desirable. Ours is in general a lean population.

Some error has undoubtedly been introduced by using "moderate" as the degree of activity of all the subjects. However, it was felt that with a large group of a general population this would introduce less error than an attempt to determine by relatively inaccurate methods the degree of probable energy expenditure of each individual. In general, the population was not characterized by lethargy or a lack of physical energy, such as would be expected had there been as great a deficiency of calories as there appeared. As has been indicated, many of the subjects were employed in rural and farming occupations, continually engaging in moderate to heavy activity without evidence of disability. Others, such as the children, exhibited the usual activity of such subjects of average nutrition. Many of these subjects must have been among those who recorded deficient consumption according to the standards used and, while there were undoubtedly some who were lacking in energy and were functionally deficient, the number does not seem to have been greater than in any general population of this size.

One of the results of a deficiency in energy is a lowering of the basal meta-

bolic rate and it might be suspected that this had occurred in those who failed to show any effect of what appear to be grossly deficient diets. However, such tests as have been made in this area fail to reveal significant evidence of such a depression and though some such effect is possible it seems unlikely that it can be the sole explanation for the lack of correspondence between body weight and the recorded calorie intake.

The best objective evidence of nutrition with respect to energy is the body weight. Examining the mean weights we find that the observed mean weights are equal to or greater than the predicted in 8 of the 20 age and sex groups of subjects. In only 2 of these groups, however, is the calorie intake equal to the recommended allowances. In the 6 other groups the calories are significantly below the recommended allowances. The 2 groups in which the calories are up to the recommended allowances are the white children 1 to 3 and 3 to 6. How colored children of the same ages were able to equal their predicted weight although significantly deficient in calories is unexplained. It might be thought that this was accomplished at the expense of a slower rate and attainment of growth, but this is unlikely because the mean height is equal to that of the whites in each group. A difference in activity is not a likely explanation. It is, of course, possible that errors in recording food intake were greater in the colored group. Two meals a day only were common among them and they may have more often forgotten to record food eaten between meals. In the 1 to 2 year olds a number may have gotten breast milk which was not included in the food consumed. All these conditions may have obtained in the whites too, but probably to a less degree than in the Negroes.

The white and colored females over

21 and colored girls 16-20, subjects whose mean weight was not below normal standards in spite of great deficiencies in calories, exhibited a considerable variation in body weight as revealed by the standard deviation. This variability, emphasizes the existence of considerable numbers of *obese* as well as greatly *underweight subjects* in the former groups, the value for mean weight representing the balance of these two extremes. This in turn suggests the existence of significant factors in calorie-weight relationship other than the supposed calorie requirement. It also suggests the possibility that such standards of requirements are incorrect.

Little of an unusual nature was found in the relative proportion of protein, carbohydrate, and fat in the diets, either in terms of grams, of calories, or as per cent of total calories. The proportion of fat as per cent of total calories is at the higher levels of the average range of such intakes while that of protein is in the lower range. Expressed in the same way, the proportions of fat in the case of the colored subjects are smaller than in the whites, reflecting perhaps the difference in incomes in the two groups in view of the characteristically high cost of fats. There is a corresponding increase in the proportion of carbohydrate but, curiously, instead of a decrease in the proportion of protein as might also be expected there is an actual increase in protein as per cent of total calories. This does not, however, signify a satisfactory or adequate intake of protein in the colored subjects. Rather the contrary is true as shown by the mean intake in grams which reveals inadequate intake in most groups. It is merely that the total calorie intake is so low that even inadequate amounts of protein constitute a higher proportion of calories than in the white group with their higher intake in grams.

An interesting feature is revealed by

the median intakes of carbohydrate, fat, and protein which are significantly and characteristically greater in the males compared with the females in the 13-15, 16-20, and 21+ age groups. This difference is proportionately greatest in the case of protein in which a maximum difference of over 90 per cent is found between white boys and girls of 13-15. However, the age group at which the greatest difference is found varies according to the dietary element. For carbohydrate the greatest difference in the white subjects is between the males and females of 16-20. For fat it is greatest at the ages 13-15 and 21+. For protein it occurs at 13-15. Similar differences might perhaps exist in the younger years but at these ages the sexes have not been separated. In the Negroes somewhat the same differences are found but of a much smaller degree, reflecting, perhaps, the lower absolute levels of intake. Nevertheless for protein a very significant difference is found in most groups and only in the males at ages of 13-15, 16-20, and 21+ is the protein intake at a minimum satisfactory level.

SUMMARY AND CONCLUSION

The methods, procedures, and techniques which have been used in a survey of the nutrition of a rural community in Middle Tennessee (Wilson County) have been described. The survey, which was conducted on a universe basis, included some 1,200 subjects of all ages and sexes, both white and colored, whose nutritional status was determined by a record of food intake, a history and physical examination, and various laboratory tests. The characteristics of the area and the population are given and the results of the survey as it relates to the energy factor (calories). The status of nutrition with regard to this factor was determined principally by the measurement of food consumption and the measurement of body weight

though such accessory indications as history of loss of weight, estimate of amount of subcutaneous tissue, etc., are included.

The findings reveal a moderate to severe deficiency (deficit) in energy (calorie) intake as measured and recorded, compared to the recommended allowances of the Food and Nutrition Board of the National Research Council. With this there was found a significant and often severe deficiency in mean body weight. Not all subjects were abnormally underweight however, even among those whose intakes ap-

peared greatly deficient and many were actually obese. Reasons are given for suggesting that the deficiency of calories is not as great as it appears and that in part this may be because the recommended allowances with which the intakes have been compared are unnecessarily high. Errors in the recording of food intake may be responsible in part but cannot explain all the apparent deficiency.

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IMPASSE IN PROCUREMENT AND ASSIGNMENT SERVICE?

IN the past few weeks newspapers and magazines have indicated a public interest in the shortage of physicians in some sections of the United States, and not long ago a Senatorial committee, as part of its man power deliberations, undertook hearings on this subject. From the tenor of published articles it is evident that there is criticism of what has been done in war utilization of physicians, of the way it has been done, and of those who have done it. There is, too, a general tendency to blame physicians as individuals and as groups, and to lay upon the Procurement and Assignment Service an ill-founded charge of lack of foresight.

Now, beyond a doubt, there is room for criticism; and one might well question the wisdom of appointing such a body, made up solely of professionals-at-interest and tied up with representatives of local, state, and national medical organizations as Procurement and Assignment Service seems to be. Still it is the instrument the Government chose and one must not lose sight of the excellence of what has been accomplished in difficult and complex circumstances. Thus it must be remembered that although Procurement and Assignment Service was appointed to meet the needs of the military services, of civilian practice and institutions, and of public health, in so far as these needs relate to the work of physicians, dentists, and veterinarians, *it was not invested with one iota of authority to compel service in any military capacity or civilian category or to say to the Army and Navy that they might have so many physicians and no more.* Yet in spite of this lack of authority, Procurement and Assignment Service has been able to meet the calls of military forces for about one out of every two physicians under 45 years of age. Inasmuch as only approximately one out of every five males of the general population in this age group has been called for military service, this is not a bad showing for physicians. As to whether or not that number of physicians is necessary for the military services is a question which Procurement and Assignment Service has had no right to answer. The military services asked for them and got them, and, under the terms of its appointment, Procurement and Assignment Service would have been subject to deserved criticism if they had not been furnished.

On the whole, that organization did not find it difficult to meet this call for medical officers. Physicians, in various proportions in the different parts of the nation, responded promptly, for there was the enticement of adventure, the glamor of a uniform, the urge of patriotism. But as the time approaches to arrange, as nearly as possible, for an equitable distribution of the physicians who remain in civilian practice, Procurement and Assignment Service's lack of authority becomes evident and its service less effective. In civilian medical service there is no glamor for the physician, no sense of adventure; no opportunity for decorations, and no basis for telling the son what Dad did in World War II. Nor would the physician, by such voluntary re-allocation, accumulate any backlog for post-war prestige and preferment. On the contrary, he would, after the war, be considered to have been a stay-at-home and, during the war, would invite a lowered income, irregular hours, and inadequate facilities. He would be forced, practically, to make a new start in life, with the old practice, built over a period of ten to thirty years, thrown into the laps of those who remained undislocated. He would be required, too, to pay last year's large taxes out of this year's shrunken income. It is not likely that in these circumstances physicians are going to volunteer for this unprofitable and gloryless sacrifice, and at present neither Procurement and Assignment nor any other agency may require them to do this.

And there the situation rests for the moment, with some axes being ground and some sparks flying. It is, obviously, only one part of the general man power problem, but even if all man power were drafted, which seems unlikely in the near future, problems inherent in allocation of physicians would vary somewhat from those of placing industrial workers: The latter would be sent to jobs; the former, to practices. The one would provide a definite wage; the other, an uncertain income. In the meantime, if the shortage of physicians in the United States as a whole, or in parts of it, is sufficiently serious to constitute an action-demanding national problem, certain provisions and arrangements would need to be considered. One of these is the possible necessity of vesting in some authority, which sees both military and civilian needs for physicians, the power to set an upper limit on the ratio of medical officers to the strength of the military forces and to establish a minimum ratio of physicians in practice per unit of population in civilian areas. Consideration, too, would have to be given to public health needs. Ratios would inevitably be lowered, perhaps in all categories, as the military forces grow, for, while Military Paul must be paid in physicians, there is a limit beyond which Peter Public may not be robbed for this purpose. A second thing deserving consideration is that this same agency—possibly Procurement and Assignment Service, broadened and freshened in all its ramifications by the infusion of a public perspective into its now essentially medical one—that this same agency would probably have to be given, finally, the authority to draft physicians for all purposes, drawing first on those communities where the ratio of physicians to population is high, physicians thus called being utilized to meet military necessities, public health demands, and medical service needs in the medically distressed areas.

Finally, in connection with civilian medical service, other practical provisions would have to be given thought: An administrative agency, salaries for physicians drafted into such duties, equipment, a mechanism for the collection of fees and the utilization and disposal of such fees—a thousand and one details. In keeping with our conviction that in both war and peace there should be but one operating health agency of the federal government, we recommend, for this administrative

function, the United States Public Health Service. And heaven help that Service if there is such a job, and the job falls to them, for it would be a thankless task, hectored, as the administrators would be, by ultra-conservatives on the one hand and exhorted by crackpots on the other.

As to whether or not it is necessary or wise to put any or all of these measures into effect depends, of course, upon the acuteness and extent of the problem. As regards a government-operated medical service, action should be taken only if the national emergency is serious enough to justify the institution of state medicine as supplementary to private practice.

EPIDEMIC KERATOCONJUNCTIVITIS

HEALTH officers, physicians in industry, ophthalmologists, public health nurses, especially those in industrial plants, and in fact public health workers in general would do well to go on an alert in regard to epidemic keratoconjunctivitis. Comparatively recently, this eye condition has made its appearance in various parts of the United States, particularly in large industrial plants, and in certain areas has interfered with production. The etiology, epidemiology, and treatment are not yet clearly cut, though definite progress is being made.

To the ordinary observer the condition is a severe conjunctivitis, beginning in one eye and not infrequently involving the other. There is but little pus though considerable lacrimation, with edema and congestion of the lids and conjunctiva. Usually the preauricular gland on the affected side is painful and enlarged. More characteristic of keratoconjunctivitis, and of serious import, is the fact that in the majority of cases there are corneal opacities. These are not difficult to demonstrate with the slit lamp. They result in some current impairment of vision and, although a fairly high proportion clear up, in an indeterminate number of instances the opacities remain long after the acute condition has disappeared. The question of their permanency is one which cannot at the moment be answered.

Sufficient work has been done to indicate that the organisms ordinarily causing conjunctivitis are not responsible for this apparently new disease. Sanders, of the College of Physicians and Surgeons, Columbia University, who reports the recovery of a virus from cases of epidemic keratoconjunctivitis, has carried it through tissue culture and continued it in mice. On neutralization tests against this virus, sera of patients affected with the disease have evidenced a rising antibody content as the disease passes its acute phase and enters into the convalescent period.

How the disease is transmitted remains in the field of speculation. Inasmuch as a fairly high proportion of cases have occurred in persons such as welders and mechanics, whose work may expose them to eye injury, there is a suspicion that a foreign body in the eye, or previous eye irritation may act as a contributing factor. It has been suggested, too, that the high proportion of cases seen in eye injury is due to the fact that the ophthalmologist's hands have become infected from some unrecognized case and that the irritated eye is subject to infection when a normal eye would not be; and there is some evidence which indicates that if an eye clinic has one such case, it is likely to have a number of others. As against this previous-injury and infection-at-eye-clinic hypothesis, is the observation that many cases occur in office workers, or occasionally in housewives, where

there has been neither eye injury nor visits to an eye clinic. There seems to be no difference in the attack rate in males and females when calculations are made on the basis of persons at risk. However, in any given epidemic, there are likely to be more males than females because in most industrial plants men predominate.

As indicated in a letter published elsewhere, the Neurotropic Virus Committee of the Army is interested in this condition, and physicians who encounter cases or suspected cases are urged to report them to the local health officer who, in turn, should advise the state health department. The latter may obtain the aid of the Virus Committee, which would not only insure careful study of the condition, but also sound advice as to the best known control measures. It is rather serious to advocate the isolation of five hundred to a thousand individuals engaged in war work, when in the majority of instances they are able to carry on to some extent. On the other hand, there is reason to believe that if the first few cases are promptly and rigidly isolated, and if auxiliary measures are instituted, a serious outbreak may be prevented. Auxiliary measures consist in an intensive search for missed cases and in scrupulous disinfection of hands and instruments in the eye clinic. In treatment, various measures have been advocated. These vary from cold compresses to sulfathiazole ointment. None is specific.

Here is a problem which will test not only the ingenuity, but the research and control potentialities of many who are interested in or responsible for the public health.

LETTER TO THE EDITOR

TO THE EDITOR:

Among some of the growing problems, which have confronted both health officers and industrial physicians in this country during the past year, has been that of epidemic keratoconjunctivitis—called by some “ship-yard conjunctivitis.” The disease is apparently new to this country but it has appeared in epidemic form, both on the West Coast, and in the East (and perhaps elsewhere) during the short space of a few months. During this period, however, much has been learned—to which recent articles by Hogan and Crawford¹ and by Sanders² testify. This information is not general as yet and apparently epidemic situations can develop insidiously in factories before the nature of the conjunctivitis in its potential seriousness is recognized.

To my knowledge the disease is not reportable in this country and because of this and other obvious reasons it

seems wise to bring it to the attention of your JOURNAL. It is earnestly requested that if new outbreaks, or suspected outbreaks, of this disease (epidemic keratoconjunctivitis) should occur, notification of this fact be made to Dr. Murray Sanders (Department of Bacteriology, College of Physicians and Surgeons, 620 West 168th St., New York, N. Y.). Dr. Sanders has been assigned by the Board for the Investigation of Epidemic Diseases in the U. S. Army to study this problem and to assist in the control of this disease.

REFERENCES

1. *War Medicine*, 2:984 (Nov.), 1942.
2. *Arch. Ophth.*, 28:581 (Oct.), 1942; see also *J.A.M.A.*, 120:538 (Oct. 17), 1942.

JOHN R. PAUL

Director, Commission on Neurotropic Virus Diseases, Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the United States Army

Credit Lines

A Selective Digest of Diversified Health Interests

D. B. ARMSTRONG, M.D., AND JOHN LENTZ, M.S.

A DAY OF HEALTH EDUCATION

Any meeting of professional workers that succeeds in imparting to the participants an increased appreciation of the value, the usefulness, and the timeliness of their efforts is decidedly worth while. This was achieved at the Annual Health Education Conference, held in New York City on November 17, 1942, under the auspices of the New York Academy of Medicine. The recent conference marked the third time in as many years that health educators representing the official and voluntary health, medical, and social agencies in the Metropolitan area foregathered as guests of the Academy to "review the objectives of health education and to plot a straight course toward them." The basic theme of the 1942 Conference dealt with the intensive wartime industrialization of the nation's communities and the health implications involved. Five timely and thought provoking papers were presented upon this thesis in which the problems of nutrition, physical and mental disease, and accidents were considered. Each speaker succeeded in giving a very clear concept of the wartime health problems of industry, from the angle of health education, and their conclusions were a decided stimulus to further thinking and current program planning.

The opening or "theme address" was delivered by Cassius Watson, M.D., Medical Director of the American Telephone and Telegraph Company. This

valuable presentation emphasized the importance of occupational disease and industrial hazards in relation to the successful pursuit of the war effort. Dr. Watson called for an extension of immunization procedures among the working population and directed attention to two factors that loom large in the efficient operation of industrial establishments—fatigue and the emotional instability of employees. The speaker also discussed the value of thorough pre-placement physical examinations and the need for focusing our efforts upon certain diseases that are becoming increasingly threatening, notably brucellosis. Dr. Watson clearly outlined those elements in the health program that demand priority rating while the nation is at war.

Otto A. Bessey, Ph.D., Director of the Public Health Research Institute of the City of New York, contributed a practical and illuminating paper entitled "Food and Nutrition in the Home and the Work Place." This paper stressed the magnitude of the problem of poor nutrition and outlined methods by which this problem is being met in various places. Among other topics covered in Dr. Bessey's discussion were the importance of employing a trained nutritionist to direct feeding in plants and schools, the necessity for providing an adequate amount of time for lunch, and the increasing recognition being given to in-between-meal feeding and its effect on the efficiency of the worker. The speaker warned the audience to keep its sense of values during the current "nutrition boom" and to turn a deaf ear to

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promoters of food preparations and enthusiastic groups given to exaggerations and elaborate claims. Dr. Bessey also directed a critical dart toward food caterers who ply their wares for profit with little regard for or appreciation of good nutrition. The preparation of home-packed lunches for working men was cited as one element in the better nutrition program upon which education is needed. It was stated that 90 per cent of the food consumed in industrial plants is home prepared and packed in lunch boxes. One important recommendation made by Dr. Bessey was that the nutritionist employed in plants should work in collaboration with the medical division.

"Disease and Handicap Detection and Control in Industry" was the subject of a paper presented by Leonard Greenburg, M.D., Executive Director of the Division of Industrial Hygiene of the New York State Department of Labor. This highly pertinent contribution included a consideration of absenteeism and the diseases chiefly responsible for loss of time: respiratory infections, digestive disorders, and others. The problem of physical defects as a cause of rejection for industrial employment was also explored by the speaker. Dr. Greenburg pointed to the urgent need for programs of rehabilitation—"a need that is important in times of peace as well as in times of war." It was the contention of the speaker that voluntary health agencies can and must assume a major rôle in helping, through education, to control the problem of disease in industry. Dr. Greenburg's presentation was decidedly challenging.

A paper by Lydia G. Giberson, M.D., Psychiatrist of the Home Office Medical Staff of the Metropolitan Life Insurance Company, was devoted to the subject: "Mental Problems and Morale in Industry." The relation of the mental state of employees to the maintenance of industrial production was convinc-

ingly demonstrated in this direct and practical analysis, which included a discussion of various neurological conditions, psychoneuroses, maladjustments, and the "twin scourges" of industry—absenteeism and fatigue. It was abundantly evident that the type of industrial psychiatry advocated by Dr. Giberson—essentially educational in character—can go a long way toward solving the problem of effectively utilizing maladjusted individuals in industry.

The final address of the Conference was delivered by Harold R. Bixler, Director and Member of the Executive Committee of the National Safety Council. Mr. Bixler's paper was entitled "Educational Methods and Control of Accidents in Industry." Following a general discussion of the magnitude of the industrial and home accident toll, the speaker outlined ways and means of "selling safety" to management and employees on the basis of patriotic, economic, and humanitarian appeals. Among the specific educational measures advocated for the promotion of safety were: job training, conferences, contests, campaigns, awards, and so-called safety stunts. Mr. Bixler's recommendations were practical and could readily be adapted in any program looking to permanent and effective safety promotion.

The presentation of the various papers was followed by an open discussion, and a general summary of the day's proceedings was excellently outlined by Iago Galdston, M.D., Executive Secretary of the Medical Information Bureau of the New York Academy of Medicine. One of *Credit Lines'* editors (D. B. A.) presided throughout the meeting.

The Academy and its Committee on Medical Information deserve the thanks and appreciation of all in attendance at this well organized and stimulating meeting. It is hoped that the papers presented—all of which were marked by wise and timely counsel—will be made available later in printed form.

They should help the health agencies to adapt their current programs to pressing wartime needs and opportunities for service.

A selection of papers delivered at the 1941 Health Education Conference has recently been published in book form under the title: "A Venture in Public Health Integration." Copies are available from Columbia University Press at a cost of \$1.00 each.

NOTES ON RECENT HEALTH PUBLICATIONS

The volume of health education materials reaching the editors of this section of the JOURNAL has markedly decreased during recent months. Perhaps fewer booklets and other publicity items are being produced as agencies suffer the loss of personnel—or perhaps health departments are devoting their energies to more pressing needs in the field. Regardless of the cause, we are glad to say that the diminution in volume has in no way been accompanied by a diminution in the quality of the printed materials received. We have, for instance, just reviewed with interest and admiration the following publications:

1. A series of leaflets on tuberculosis, published by the Medical Department of the Westinghouse Electric and Manufacturing Company. Eight leaflets have been developed on the subject covering diagnostic procedures, signs and symptoms of the disease, methods of transmission, protective measures, nutrition in relation to recovery, treatment of the disease, and the possible increase in mortality from tuberculosis due to war conditions. These leaflets have many attractive aspects. The text of each is forthright, though certain statements here and there would perhaps be questioned by some authorities. Details of color, layout, illustration, and composition have all been thoughtfully and skillfully handled. It strikes us that the idea of breaking up the subject

matter into short leaflets is an interesting departure from the usual practice of presenting the subject as a whole within the scope of a single publication. According to the Westinghouse plan, these leaflets are to be distributed to employees at two week intervals. Will readers gain more by way of this "installment plan" or would a "massive dose" of information be more practical? It would be interesting to know how the employees respond. We recommend this excellent series and commend the enterprise of the commercial organization responsible for them. Copies of the leaflets may be secured from the Westinghouse Medical Department, East Pittsburgh, Pa.

2. The sixth number of the U. S. Public Health Service Workers' Health Series bears the title "Bill Gets the Works." This is a remarkably clever interpretation of the procedures involved in a physical examination and is easily the best of the Workers' Health Series produced so far. Written in a popular conversational style, this booklet will convince employees of the importance of physical examinations and will dispel the impression that "a check-up is just one of those things that the plant 'Doc' has to do to earn his pay." The simple illustrations are "just right" and help to make this a consistently amusing and instructive publication. Copies of "Bill Gets the Works" are available from the Superintendent of Documents, Washington, D. C., at a cost of 5 cents each.

3. Workers in the field of safety education are assuredly attuned to the times—ample evidence of which is seen in a booklet issued by the Greater New York Safety Council entitled, "You and Your Horse." Since many companies have parked their delivery trucks for the duration and replaced them with horse-drawn vehicles, it is well to have authoritative advice available on how to "care for your horse and operate your

wagon safely." Even if you are not faced with a return to horse and buggy transportation, you will thoroughly enjoy reading this booklet which includes among its contents information on such subjects as how to tether your horse, how to make him "back up," how to handle nervous horses, and how to apply auxiliary halters. "Whoa, Dan"—while we tell our readers that this booklet is available from the organization mentioned above, 60 East 42nd Street, New York, N. Y., at 5 cents per copy. "Gid-dap, Dan."

4. Excluding the usual syndicated health columns, newspapers—with a few notable exceptions—are not given to featuring health news. Occasionally, however, special supplements on the subject are published jointly by health or medical agencies and newspapers. With the current emphasis on physical fitness, it is surprising that these supplements do not appear more frequently. An unusually good example of this type of publicity was sponsored recently by the Philadelphia County Medical Society and the *Philadelphia Record*. In twenty pages of tabloid size, the cartoon-strip technic is used to popularize first aid procedures, accident prevention, nutrition, communicable disease control, and personal hygiene. This supplement has considerable "reader interest" chiefly because it avoids the essay or feature story method of presenting health information and utilizes instead the simple, to-the-point approach that is inherent in the cartoon medium. The execution of the drawings and the authentic captions accompanying them show that this supplement was painstakingly worked out. Any health educator armed with a copy of this supplement could no doubt readily convince local editors to undertake a similar venture. Copies of the supplement may be had by writing the Philadelphia County Medical Society, Philadelphia, Pa. We compliment the Public Relations Com-

mittee of the Society and the staff of the *Philadelphia Record* upon rendering a helpful service to the people of the community.

5. Another effective health agency-newspaper venture was sponsored a short time ago by the Public Health Federation of Cincinnati and the *Cincinnati Post*. This consisted of a series of twenty-five articles admonishing citizens to "Be a Health Warden." The series was keyed to the theme that many local doctors are entering the armed services and that individuals must assume responsibility for safeguarding their health. Some of the titles in the Health Warden Series were: Let Your Heart Speak, Show Your Teeth, The Art of Blowing Your Nose, and Babies and Battles. It is reported that the series was enthusiastically received by readers of the *Post*.

6. From the Harlem Tuberculosis and Health Committee of the New York Tuberculosis and Health Association comes a historical report entitled "Twenty Years of Community Health Work." This statement recounts the activities of the committee year by year, and one finds in it an inspiring record of service on behalf of the people of Harlem. The report is conveniently organized and written in an earnest and direct style. Of especial interest is the cover which bears a well balanced type arrangement and an arresting illustration. Copies may be secured from the New York Tuberculosis and Health Association, 386 Fourth Avenue, New York, N. Y.

7. An "A-B-C" interpretation of the Kenny Technic may be gained by reading a folder issued by the National Foundation for Infantile Paralysis under the title, "Principles of the Kenny Method of Treatment of Infantile Paralysis." By listing only the essential facts underlying this form of therapy and by including a few simplified drawings, this publication does an excellent

job of simplification. It should be particularly useful in explaining the Kenny Technic to lay groups. Write to the Foundation at 120 Broadway, New York, N. Y., for copies.

8. The American Social Hygiene Association has sounded its call to the public to enlist in the fight against syphilis and gonorrhea on Social Hygiene Day, February 3, 1943. A neat, well planned folder with the heading "Social Hygiene Takes Battle Stations," outlines various activities that may be undertaken to rally support and to inform the American people about the dangers of venereal disease. The Association suggests many ways of obtaining publicity and will furnish prepared talks, films, literature, exhibits, radio material, and other publicity aids for use in connection with Social Hygiene Day. The Association's publicity staff is certainly adept at preparing lively and informative promotional materials.

POSTERS WITH "PUNCH"

Here we go again on what must appear to be our favorite subject for comment—posters. This medium was never more popular than now: witness the contests that are sponsored, the exhibits that are held, and the financial grants that are made—all for the purpose of stimulating artists to sharpen their technics, to create posters with a "punch." Here, then, are a few more observations on the subject:

"A poster is a form of commercial art—it has something to sell—and its style must be determined by that plain fact. In designing a poster, remember that it must get its idea across in the time that it takes an express train to pass a water tank. It is not meant to be hung on a wall and admired at leisure, or to serve as an illustration in a magazine. And so it cannot afford to flirt with modernistic or abstract effects. It must say what it has to say all at once, right now, and all in the foreground where

the eye can take it in at a glance. Consequently, the successful poster presents a few, carefully chosen words and objects held close to the front plane rather than receding into the background where the quickly passing eye cannot possibly follow. For the same reason, colors must be used in large areas rather than in small details—which is why a good poster looks almost as well in a black and white reproduction as in its original form."

With these facts in mind, we turn to two sets of posters on the venereal diseases—one of which comes from the Venereal Disease Control Officer of the Third Naval District, Lieut. Commander M. Wishengard; the other from the American Social Hygiene Association. The Navy has developed thirteen posters dealing with the prevention and treatment of syphilis and gonorrhea. The art work of each is simple—there are no illustrations aside from decorative border designs in which certain Naval symbols—anchors, ships, ropes, waves, and the like—are reproduced. Two or three colors are used in each poster and they have been selected so as to achieve the most effective combination of tones and hues. The text of each poster is compact and forceful. It was pleasing to find that there was no straining to clutter up these messages with the overworked military motif. In sum, these posters are unusually well done—artistically and textually.

The American Social Hygiene Association has produced six venereal disease posters for display in industrial plants. They measure 11 by 14 inches and are reproduced in two colors. The copy of each is appropriately brief and the illustrations are pleasing. These posters should amply fill the bill for they are admirably done in a style that should appeal to the man behind the machine. Write to the Association at 1790 Broadway, New York, N. Y.—50 cents per set.

Incidentally, we learn that one agency

that has issued many venereal disease posters in which the symbolic motif has prevailed has now discarded this approach and will henceforth revert to "true and literal representations." Why? Because the bulk of the population did not understand symbolic designs.

AN EDITORIALETTE:

HEALTH EDUCATION'S PART IN WINNING THE WAR

The public health profession of America has never faced a greater challenge than today. Any war brings public health problems of enormous variety and magnitude. War, famine, pestilence, and death are still inseparable companions. But this war far exceeds all others in its public health implications.

Wars are not won conclusively by conquering armies or by invading homelands. They are won finally by destroying the will of the conquered peoples to fight back. No better implements for this purpose exist than malnutrition, tuberculosis, the ravages of epidemic disease.

It is the heavy responsibility of the public health profession to guard the health of the workers at home so that their efficiency may be kept at a maximum, to protect the entire population from loss of stamina through manifest illness or lack of robust health, and to protect the armed forces from exposure to health hazards outside the boundaries of their cantonments and from worry over the health of their families at home.

This is a large order under existing circumstances. It is an order, the filling of which will require more health education than ever before.

Since the objective of health education is to improve health behavior, and since so much preventable illness and premature death in this country today is a result of improper health behavior and incorrect health attitudes, health educators share as largely as any other

branch of the public health profession the heavy responsibilities of helping to win the war on the home front.

Our responsibilities are graver today and heavier than ever before. We must prevent in this nation, if we can, some of the underlying causes of defeat in any nation; to remedy, so far as we can, some of the reasons for defective health behavior in this nation; and to solve, so far as is within the power of our most earnest efforts, some of the problems confronting all health educators.

One of the greatest of these problems has been the confusion which exists with respect to the values and technics of modern education when applied to the field of public health. Stemming as it does from the engineering, medical, and related professions, public health has been slow to appreciate fully the potential contributions of education. Education too has been slow in developing health teaching methods and accepting the importance of health teaching as one of its primary objectives. Between the two professions of public health and education has been the barrier of differing professional "lingo." This barrier has at times assumed the characteristics of an insulating double brick wall. But a few hardy souls in each profession have had the courage and patience to run around the barrier, listening and asking questions of the other group and returning to their own group with gems of wisdom interpreted in their own language. Soon the curiosity of each group was aroused and we now find educators being invited to advise with public health officials and health officers being invited to advise with educators. It would seem that this age-old barrier is about to be breached.

One of the most significant steps toward clearing confusion in the field of public health education is the emergence of a report from the APHA Committee on Professional Education on the educational qualifications of health educa-

tors. This committee has described clearly and briefly the values of health education both in schools and health agencies. Most important of all, perhaps, it has concluded that health educators, whether employed by schools or health departments or both, are essentially educators and need full training in both education and public health. Finally, it has listed the academic training which seems most desirable for professional preparation in this important field. This report will soon be ready for publication in its preliminary form in the JOURNAL.

Meanwhile, the professionalization of health education has already been advanced immeasurably through the efforts of this committee. It has distinguished between health education, information, and propaganda. It has defined the proper place of publicity in health education. It has shown the health officer how he may use the skilled health educators to the best advantage. It has formed the basis of a merit system examination for some state departments of health.

Health educators must play an important part in winning the war. This is a cause even greater than we have faced before. It permits no trifling. Confusion as to the status, functions, and training of health educators is being reduced by an increasing rapport between the two great professions of education and public health. A great advance will be made when educators and public health authorities can agree on the functions, responsibilities, values, and training of those professional people who wish to devote themselves to the field of health education.

This editorialette was contributed by William P. Shepard, M.D., Assistant Secretary and Pacific Coast Welfare Director of the Metropolitan Life Insurance Company. It is based on Dr.

Shepard's remarks at the opening session of the 1942 Health Education Institute. We are grateful to Dr. Shepard for his fresh and penetrating appraisal of the rôle of health education in world affairs.

MAGAZINE ARTICLES AND BOOKS

Recent popular magazine articles on health or of medical import:

"Heart Disease and You." Peter J. Steincohn, M. D. *The American Mercury*. December, 1942.

"Protect Your Family from T.B." Edwin R. Levine, M.D. *Parents' Magazine*. December, 1942.

"Hemorrhoids." Maxine Davis. *Good Housekeeping*. December, 1942.

"Animals as Allies." Priscilla Jaquith. *Coronet*. December, 1942.

"What You Don't Know Won't Hurt You." Richard Wright. *Harpers Magazine*. December, 1942.

"The Biologist Looks at Man." By Julian Huxley. *Fortune Magazine*. December, 1942.

"Quick Repairs for Broken Bones." Elsie McCormick. *The Reader's Digest*. December, 1942.

(The above is not presented as a complete list and the articles cited are not necessarily recommended.)

Current publishers' lists are replete with books with a medical or health flavor. They range from novels and humorous essays to the more scientific type of statement. As our readers may wish to buy or borrow some of these books, we give you herewith titles, authors, publishers, prices, and brief "quotes" concerning each:

Big Doc's Girl (a novel). By Mary Medearis. Published by J. B. Lippincott Company, \$2. "A chronicle of a small-town doctor and his family—has freshness and a thoroughly genuine quality."

Insides Out. By John Mason Brown. Published by Dodd, Mead and Com-

pany, \$2. "Anyone who has done time in a hospital will enjoy this laugh provoking book about surgery, doctors, nurses, visitors, pills, and needles."

The Art of the Healer. By Bernard Aschner, M.D. Published by the Dial Press, \$2.75. "Concerns a new system of medicine—constitutional therapy—which the author hopes may endow the healing art with new powers."

Science in Progress. Edited by George A. Baitzell. Published by Yale University Press, \$3. "Reports the latest developments in several fields of science, including medicine."

How To Be Fit. By Robert Kiphuth. Published by Yale University Press, \$2. "Shows how to get into 'fighting trim' in a few short weeks."

The Microbe's Challenge. By Frederick Eberson. Published by the Jaques Cattell Press, \$3.50. "Timely information for the average reader on home-front killers—flu, infantile paralysis, plague."

Adventure in Blood Transfusion. By Bertram M. Bernheim, M.D. Published by Smith and Durrell, Inc., \$2.50. "The wondrous story of a great surgical achievement."

Silent Enemies. By Justina Hill, M.D. Published by G. P. Putnam's Sons, \$2.50. "The story of the diseases of war and their control."

Love Against Hate. By Karl Menninger, M.D. Published by Harcourt, Brace and Company, \$3.50. "An analysis of the war of emotions within the human being."

Memoirs of a Guinea Pig. By Howard Vincent O'Brien. Published by G. P. Putnam's Sons, \$2. "For everyone who has been to a doctor, knows one, or is one."

JOTTINGS

A statement worthy of prolonged applause: "An author who writes of scientific matters for the public has a twofold obligation: accuracy and truth must not be distorted; the reader must

not be misled by unconfirmed information. Such writings should be ruthlessly criticised by experts long before the type is set." (Justina Hill, M.D., Johns Hopkins School of Medicine.) Certain popular articles published lately have flouted these desirable principles. . . . Historical note: The first American newspaper, the short-lived Boston *Publick Occurrences*, carried in its first issue, dated September 25, 1690, two paragraphs of health news. The comments concerned the smallpox epidemic in Boston. . . . Slips that pass in the night: Copies of a first aid handbook were recently distributed with this errata note attached—"Please open your copy at page 58 and strike out the words 'tincture of iodine (2%)'." This is an editorial error; it should read 'calamine lotion.' . . . We are glad to learn that the Executive Board of the A.P.H.A. has authorized the appointment of a Committee on Accidents which will be concerned with industrial, home, farm, and public accidents. Personnel of this committee will be announced later by the Committee on Administrative Practice. This step is of especial interest to health educators, inasmuch as it will open new fields for using educational technics. The new committee is expected to work in close collaboration with the Home Safety Advisory Committee of the National Safety Council. . . . As a contribution to the national nutrition program, the Aetna Life Insurance Company has released a two-reel film entitled "Vitality for Victory" in which the normal nutritional needs of industrial workers and other groups are stressed. . . . *The Lancet*, British medical journal, ever a source of inspiration, pays this tribute to public health nurses: "Let us now praise District Nurses and the Committees that begat them, for they are daughters to the aged, mothers to the motherless, sisters to them in labour, whose hands, holy but sterile, heal the

sores of the outcast and the blains that have broken, clip the beards of the ancients and the nails of them who cannot bend or see, who perform the task of the menial and are paid with the thanks of the lowly and the privilege of service, who come like sun to the prisoned and song to the cottage, who bring the news of the village and the jest of the market, and bear a message from one who is sick to another, who ease the way of the dying and the crown of the baby, who watch the going of life with *stertorous gliding* and its coming with bulge and recession, oft keeping vigil by candle, who must walk in men's ways alone, warily treading between the footmarks of gossip, the ruts of malice and the paths of the partisan, who oft see the dawn of a day, but know not the labours it's bringing. O apostles of soap and sanity, O black-bagged friars of country lanes, Angels on Pushbikes, I salute you, District Nurses!" . . . An excellent paper entitled "The Use of Radio in Health Education" was recently presented before the Annual Institute for Education by Radio. David Resnick, publicity director of the National Society for the Prevention of Blindness, spoke on this

topic. His talk is an interesting and informative analysis of what is being done through radio in the health education field—including references to the broadcasts sponsored by the American Medical Association, the New York Academy of Medicine, and other leading agencies. Mr. Resnick lays stress upon the importance of having health broadcasters work more closely with radio experts in planning health talks for radio audiences. He also analyzes the actual and potential effect of the war situation on the use of radio time by voluntary organizations in the health field. Copies of Mr. Resnick's address may be obtained by writing to the Society at 1790 Broadway, New York, N. Y. . . . Many interesting health education projects are being worked out by United China Relief—including the formulation of a basic language for the dissemination of medical and health information. . . . The American Academy of Pediatrics has set up a special committee to establish standards which should be met by all physicians engaged in child health services. . . . A quotation from Surgeon General Parran: "Public health will be the spearhead for future international agreements."

BOOKS AND REPORTS

History of the School of Nursing of the Presbyterian Hospital, New York 1892-1942 — By *Elleanor Lee, A.B., R.N., Assistant Professor of Nursing, Department of Nursing, College of Physicians and Surgeons, Columbia University. New York: Putnam, 1942. 286 pp. Price, \$3.50.*

Cherished by its graduates as the embodiment of their accomplishments and traditions, this book will also be cherished by nurses everywhere as a history of nursing in its broadest and deepest sense. Herself a teacher of nursing history, the author has made a contribution which will be welcomed by other teachers and students of this subject.

A remarkable feature of the book is the author's success in tying up the history of a great institution, and the biography of certain leaders in nursing, with that of the profession as a whole; with the development of medicine and public health; with the civic and social growth of the community which it serves. Historical facts are interspersed with choice bits of reminiscence such as are usually scattered about in minutes, in note books and training school records, and in the minds of older members. These have been painstakingly assembled and delightfully presented. To the younger nurse, they give a vivid picture of an earlier period against which to place her own opportunities and experiences. The older nurse is sent back to the good old days with the feeling that the diary of 1897 must have been her very own.

The history of the school naturally divides itself into two periods, that under the guidance of Miss Maxwell and that under Miss Young. While the lengthened shadows of these two are

constantly visible, the contributions of others have been given individual mention and consideration. One is also conscious of the understanding and staunch support of the medical staff and the board of governors, whose part is seen in every undertaking of the school and in every related movement.

Without attempting to describe in full the contents of the book, some features of special interest may be noted. For instance, in the development of the curriculum, changes have taken place only after careful study of the situation elsewhere and in line with sound principles clearly stated and practically followed. In the words of Miss Maxwell "We must note the signs of the times, keep abreast of modern thought and make the conditions and equipment of this school the best in the country." The progressive steps taken in pursuance of these aims are clearly indicated. These gradually resulted in affiliations with Columbia University until in 1935 the School of Nursing became the Department of Nursing under the faculty of the School of Medicine.

Interesting reading are the chapters on the Alumnae Association and on Visiting Nursing and Social Service. Most thrilling of all perhaps is the record of service in three wars. It was to this school that the American Red Cross turned, in the Spanish-American War, for a leader to establish the first group of trained nurses in an army camp in this country. In this undertaking, Miss Maxwell was joined by others of her staff. The record established at that time was carried forward into the first world war and the present conflict.

In addition to the history proper there is a chronological list of events,

and an appendix containing much valuable material. The excellent set-up with its numerous illustrations adds to the value and charm of the book. We venture to predict that in future annals of the school this volume will be counted as one of its great achievements.

HARRIET FROST

Why We Have Automobile Accidents—By *Harry R. De Silva*. New York: Wiley, 1942. 394 pp. Price, \$4.00.

Reasons why health officers should be interested in the automobile accident problem have been brought out in meetings of the American Public Health Association. In this book, De Silva summarizes in interesting fashion the information on this subject which is available at the present time. While recognizing that numerous factors enter to complicate the problem, for example, the road, the car, and the pedestrian, the author emphasizes the predominant rôle played by the driver. Accordingly we find among the sixteen chapters of the book, such subjects as the following: skill; safety-mindedness; speed; incompetent drivers; training and examining drivers; and control of licensed drivers.

An abundance of statistical material is cited which, as in most discussions of automobile accidents, is rather inadequate. The trouble is the lack of information on such factors as the populations and mileages subjected to specific risks, e.g., at different hours of travel, different kinds of roads, etc. The health officer would be in a comparable predicament if, for example, he could not compare the white and Negro death rates from tuberculosis, but only the deaths, because the exposed white and Negro populations were unknown. The paucity of information on population exposed to risk is recognized by De Silva and other writers; but one sometimes wonders whether, with more liberal employment of index numbers, better use could not

be made of such traffic data as are available.

There are informing chapters at the end of the book on preventive programs, and the administrative problems underlying these.

All in all, this is an important book. It should be read widely.

A. W. HEDRICH

Psychology Applied to Nursing—By *Lawrence Augustus Averill*, and *Florence C. Kempf*. (2nd ed.) Philadelphia: Saunders, 1942. 455 pp. Price, \$2.50.

The first reaction of most nurse educators to textbooks on specialized subjects "applied to nursing" is: What has been left out or written down in order to make this material apply to the field of nursing?

Undoubtedly, a selection and adaptation of subject matter from the field of psychology are desirable in teaching student nurses, but to this reviewer such a textbook is a sorry compromise for a well qualified instructor who is a specialist in this field and who works with the other faculty members in the school of nursing to enrich the psychological content of the whole curriculum. As one reads these chapters, he is also struck by the fact that the same goal might be attained by offering student nurses an elementary course in general psychology with applications in the ward and clinical experiences under the guidance of a qualified consultant psychologist.

The revised edition of the original textbook (1938) approaches its problem under five headings: The Regulation of Our Behavior, The Mechanisms Behind Our Behavior, The Relationship of Learning to Behavior, Behavior in Specific Life Periods, and Behavior as Related to Emotional Life, and there has been added material dealing with the emotional reactions and psychology of childhood, as well as a revision of

the "thought problems" at the end of each chapter. There is no doubt about the practicality of these "thought problems" when discussed under the leadership of a psychologist, and the general text of this book is very readable.

Public health nurses will find the last chapter (Chapter XV) interesting and all the reading lists helpful.

DOROTHY DEMING

Bonnie's Baby Brother and How He Grew—By *Elizabeth Rider Montgomery*. New York: Stokes, 1942. 95 pp. Price, \$2.00.

This book contains an attractive series of photographs with a simple and brief text made by a mother for her 5 year old daughter which presents pictorially the rapid growth and development of a new baby brother, at successive 2 month periods, during his first year of life. It portrays the rapidly changing and increasing relationships between the new baby, his sister, and the parents.

A main purpose of the book is to prepare an older child for the arrival of a new member of the family. This is neatly and casually done in picture and text. Section II, "Two-Month Old," perhaps should include an illustration of attempts of vocalizing instead of placing this illustration in the "Four-Month Old" group.

Although this book should help prepare any child for a new addition to the family, naturally it cannot be expected to accomplish this by itself. Of primary importance are the attitudes of and preparation given by the parents to an older child long before birth of a new baby. More attention than necessary is given to the anterior fontanel and care needed to protect it. Slightly more attention and emphasis than may be warranted is given to the older child's responsibility for helping with the baby's care. One gains the impression that the mother may be fearful that her daughter may not love the baby and so

compensates by overdoing the matter of preparing the older child.

In other respects the text is beautifully presented. Children from 3 years of age should enjoy and appreciate this book. No doubt young mothers preparing for their first-born may find the book informative as to changes in growth and development to be expected in the first year of their child's life.

GEORGE S. FRAUENBERGER

Nutrition and Chemical Growth in Childhood. Vol. I. Evaluation—By *Icie G. Macy*, Springfield, Ill.: Thomas, 1942. 432 pp. Price, \$5.00.

This first of two volumes presents the results of ten years of intensive clinical and biochemical investigation of normal children. The study was soundly conceived and was carried out with infinite care for scientific detail. Volume I consists of detailed discussion of factors involved in such a comprehensive study, of methods used, and of records kept. The book also gives brief glimpses of summarized results. The second volume will concern the interpretation of these results and, it is to be hoped, the complete data obtained in the studies.

The detail of the descriptions in the present volume will make the book a most helpful reference for those engaged in similar studies. The summarized results are a valuable contribution in themselves and serve to whet the appetite for Volume II, which will contain the detailed results.

GENEVIEVE STEARNS

The Modern Attack on Tuberculosis—By *Henry D. Chadwick and Alton S. Pope*. New York: Commonwealth Fund, 1942. 95 pp. Price, \$1.00.

This concise manual sets forth all the information essential in the formulation of a program for controlling tuberculosis in any community. All phases of

the disease are efficiently discussed, including epidemiology, case finding, diagnosis, and treatment. The simple practical manner in which the authors present the epidemiological aspect is of particular interest to all public health workers. Too frequently control programs exclude practical application of all the information available from the epidemiological viewpoint.

The importance of hospitalization is properly emphasized. Case finding is discussed thoroughly. Basing their views on a wide experience in the examination of different population groups, valuable information is given concerning the groups most productive of new cases of tuberculosis. The unimportance of the mass examination of school children as a means of case finding is stressed.

The last chapter deals with the various steps to be taken in organizing a community campaign for the eradication of the disease. The forecast expressed by the authors for the eradication of tuberculosis may be somewhat optimistic; nevertheless, such a goal should spur the interest of all.

This book should be in the library of every health department and used as a handbook by health officers, public health nurses, and all others interested in tuberculosis control. R. S. GASS

Microbiology of Meats—By L. B. Jensen. Champaign, Ill.: Garrard Press, 1942. 252 pp. Price, \$4.00.

This monograph is based on many years of experience in applied bacteriology, the most recent of which have been spent as Chief Bacteriologist of one of America's largest meat-packing concerns in Chicago, Swift and Company. Dr. Jensen therefore speaks from much experience when he reviews what goes on microbiologically "in the yards." *Microbiology of Meats* is divided into 12 chapters.

As should be the case, the monograph

starts with Introduction and History followed by discussions of such subjects as nitrate curing, gaseous fermentation of meat products, green discoloration, action of microorganisms on fats, ham souring, microbiology of fresh meats, sausage, bacon, and other meat specialties. Control of microorganisms in the meat-packing plant is discussed in considerable detail, attention being given to contributions of microorganisms which might be made to meat products by such things as paper, sawdust, and wooden apparatus. The final chapter deals with food poisoning problems on which much more light is needed in some quarters.

The book is well documented with references to the literature. It should be in the libraries of all food technologists and especially of all those who work for meat preservation concerns. It is also a fine example of the art of book making. F. W. TANNER

Emergency Care — By Marie A. Wooders, R.N., and Donald A. Curtis, M.D. Philadelphia: Davis, 1942. 560 pp. Price, \$3.50.

This is an excellent textbook on emergency care, intended for the use of nurses. It should be just as useful to those who have taken the Red Cross First Aid and Home Nursing courses.

The authors use many effective diagrams, tables, and photographs. Especially useful in this period of emergency should be the unusually good material assembled in the section on General Emergencies. The sections on Hospital and Occupational Emergencies are also well handled.

The book is helpfully indexed and there is a useful set of questions, with a bibliography at the end of some of the chapters. It is to be regretted that the authors did not see fit to have this worth while feature at the end of all chapters. One questions the necessity of the chapter on the Organizations of

the Army and Navy, but these are only minor criticisms.

Altogether for the purposes for which this book is intended, the reviewer feels that the objectives have been accomplished. HARRY E. UNGERLEIDER

The Meat You Eat—The report of the New York State Trichinosis Commission. Legislative Document 35, 1942. 94 Broadway, Newburgh, N. Y., 1942. Paper, 141 pp.

The Meat You Eat is the second and final report of the New York State Trichinosis Commission which was created in 1940, and extended in 1941 with the object of recommending methods of preventing trichinosis in New York State. The present report, while not as complete as the original one entitled *Meat for Millions*, nevertheless is interesting in relation to the matter of trichinosis. A brief history of trichinosis and a report of recent outbreaks is presented and trichinosis developments during 1941 are reported by Dr. W. H. Wright of the National Institute of Health. The recommendation by the commission that the state adopt compulsory meat inspection, locally administered, has been approved. Previous recommendations of the commission were also adopted in 1941. The present report does not deal exclusively with pork, and embraces the subject of meat, its inspection and its place in the dietary. This report is a useful contribution to the subject of trichinosis, and if widely circulated to the laity should help educate the public without frightening them about pork, or detracting from its value as a foodstuff.

HARRY MOST

Psychology in Nursing Practice—By Philip L. Harriman, Lila L. Greenwood and Edward Skinner. New York: Macmillan, 1942. 483 pp. Price, \$3.25.

Here is a psychology written for both nurses in training and nurses in service,

by a professor of psychology, a professor of education, and a nurse who is a teaching supervisor in a hospital in addition to being an assistant instructor of therapeutics to medical students. Such a combination of authors accounts for the scientific accuracy, broad outlook, practicality and up-to-dateness which this textbook displays.

The philosophy of the contents is the same as that of *A Curriculum Guide for Schools of Nursing* (1937 edition). The pattern of organization into four units is also the same as that recommended in the *Guide*. One chapter deals with the Nature and Methods of Psychology, five chapters, with the Biological and Social Basis of Behavior; four chapters with Essentials of Learning, and six chapters with Personality and Adjustment.

Particularly good is the chapter entitled "The Behaving Organism" with its excellent diagrams and graphs drawn from a wide field of recent research. The chapter ends with a good description of the physical and personality changes brought on by old age and senility. The treatment of the chapter entitled "The Atypical and the Socially Maladjusted" with its case histories is especially valuable for nurses.

The chapter on the Psychology of Mental Deficiency and Mental Disorder, by Robert M. Lindner, Ph.D., of the U. S. Public Health Service, opens up some interesting theories about the causes of mental deficiency. Here Dr. Lindner expresses his views as to the possibility of alteration of the germ plasm in syphilis. In the chapter on the learning process, the statement that a pan of water on the radiator is sufficient as a device to raise the humidity of a room is open to question.

There are footnotes on nearly every page, an extensive series of questions and exercises, and a list of selected references at the end of each chapter.

The appendix contains monthly rec-

ords for judging personality and professional efficiency, suggested reference books for students of nursing in the various fields of psychology including mental hygiene, and an excellent vitamin chart. There is an index of subject and an index of names.

Nurses in training and in service have a treat coming if they have to use this textbook, which, in addition to being on a high intellectual plane, embodies the fundamentals of all the types of psychology and ties them up with the actual patients and problems nurses have in the hospital or in the home.

EVA F. MAC DOUGALL

The Mentally Ill and Public Provision for Their Care in Illinois—By Stuart K. Jaffary. Chicago: University of Chicago Press, 1942. 214 pp. Price, \$1.25.

This is one of the many good monographs in the University of Chicago Social Service series. The approach is essentially social but with liberal informative data on the legal and institutional aspects. The focus is well expressed in the introduction, "The present study lies in the field of public responsibility for the care of the mentally ill."

The medical profession as well as the general public should find this work of distinct educational value. Insanity is not only a term of sociolegal origin, but it is also a problem essentially for the public services and the legal channels which largely control the public approach to it.

Medicine had better realize that psychiatry is a neglected problem child in the medical school curriculum. The public had better look to its legal administration in probate work as this study shows amply the indifference, apathy in the two approaches.

We cannot agree with the writer that psychiatric treatment is so costly that it is beyond the reach of all save a small number of wealthy persons (page

175). This is over-argument for public control. Hospitalization plans, such as in Cleveland, have bridged nicely the short periods of institutional major therapy. Then too the needed development of psychiatric service in general hospitals will lessen the need for a huge expansion of public facilities which practically are never sought out by the patient and used then as a last resort.

MAURICE A. R. HENNESSY

Microbiology and Man—By Jorgen Birkeland. New York: F. S. Crofts & Co., 1942. 478 pp. Price, \$4.00.

This volume contains four sections. The first (130 pages), on Fundamentals of Microbiology, contains nine chapters on general properties of microorganisms, their physiology, etc., including a historical introduction, a chapter on methods of study, and several on such phenomena as variation and effects of chemical and physical agents on microorganisms. The second section (49 pages) contains four chapters on Infection and Resistance, but one discusses the spread of infectious disease, and one epidemiology and the use of biostatistical methods. Section three, the largest in the book (185 pages) describes over thirty Common Infectious Diseases. The diseases are generally discussed under three or more headings, an example being whooping cough: symptomatology, etiology (synopsis of *Hemophilus pertussis*), pathogenesis of the disease, immunity, epidemiology, prevention, and control. The last section of 77 pages on the Microbiology of Food, Milk, Water, Sewage, and Soils contains a chapter on each of these topics as well as one on Food Toxemias and Food-borne Infections. A condensed synopsis of the orders, families, and tribes of the Class Schizomycetes, a glossary, a list of pertinent publications, and an index complete the volume.

The author has a good grasp of his subject and writes interestingly and

concisely, sometimes all too briefly. The book is relatively free from factual error, and is generally up-to-date. Although there are several excellent pictures and graphs, it would be much improved by more illustrations, tables, and specific instances. Laboratory methodology is almost entirely absent. The material is developed primarily for the student of medical and public health bacteriology, although the author has aimed at a general treatise.

MARTIN FROBISHER

Nursing History—By *Minnie Goodnow*. (7th ed.) Philadelphia: Saunders, 1942. 495 pp. Price, \$3.00.

This is very readable history. Much has been added to this seventh edition from Miss Goodnow's further study of source material and her personal observations in many countries. The author has not only dealt with developments in nursing in the countries where most progress has been made, such as England and America, but she has included interesting sketches of developments in all European and Asiatic countries that can boast of a nursing program.

Beginning with nursing in ancient times, Miss Goodnow traces the outstanding developments in nursing, point-

ing out how nursing has been influenced by war, religion, and the change in the status of women. With the rapid changes of the present emergency, it is regrettable that this new edition could carry the reader no further than the threshold of World War II. The weakest part of this history is in the field of public health nursing although the author speaks of this field as "the most important future development in nursing."

Instead of using space to give cases to illustrate the need for social service, a few case histories to illustrate good family health work would have given a truer picture of public health nursing. The participation of the government in public health nursing and its far reaching influence on standards through the nursing bureaus of the U. S. Public Health Service and the Children's Bureau should have been stressed.

While Miss Goodnow gives due credit to the work of the Red Cross in its contribution to nursing in other countries, the place played by the Rockefeller Foundation in its extensive program for nursing education and public health nursing in coöperation with government agencies throughout the world is given very little attention.

MARGUERITE WALES

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Small Wisp Points Gale's Direction—In New York State, the September death rate from tuberculosis was 43.5, an increase of 14 per cent above that of September, 1941. The last increase of such magnitude occurred in 1917, the first year of our participation in the first, or youth's size, World War.

ANON. Health Conditions in New York State—September, 1942. *Health News*. 19, 45:189 (Nov. 9), 1942.

Odd Items from Everywhere Department—Did you know this? "One interesting and little known fact about drinking, is that water taken on an empty stomach may lead to greater thirst, as the liquid passing quickly to the tissues, may provoke a diuresis of greater volume than the liquid drunk."

ANON. Editorial Notes. *J. Roy. Inst. Pub. Health & Hyg.*, 5, 10:183 (Oct.), 1942.

Just in Case—What was done in a built-up region that was heavily bombed on consecutive nights makes gruesome but useful reading. Great need was found for temporary housing accommodations, and the sanitary problems created by the nightly exodus were many and difficult, as any health administrator would anticipate.

ANON. Public Health Aspects of Intensive Air Raids on a Built-up Area. *Pub. Health*. 56, 1:7 (Oct.), 1942.

Good Record Proudly Presented—Eight points of an attack against cancer as developed in a 13 year old county program are convincingly reported upon. Outstanding in the educational phase is the approach to teen age school children.

ADIE, G. C., and CHARLTON, H. R. Cancer Control in Westchester. *J.A.M.A.* 120, 10:752 (Nov. 7), 1942.

Against Venereal Disease in Industry—Ways to find and refer for treatment all venereal cases among industrial employees so that patients may continue on the job without danger to themselves or their fellow employees is a timely topic. All health workers, as well as those to which it is addressed, will profit by reading this committee report.

ANDERSON, O. L., *et al.* Recommendations to State and Local Health Departments. *J.A.M.A.* 120, 11:828 (Nov. 14), 1942.

More Anti-venereal Effort Needed—Blood tests of military candidates have revealed 200,000 men with syphilis. Current reports indicate that only 40 per cent of them have been placed under treatment. Of the men in the services 4 of each 100 contract venereal disease in our communities. These are some of the indications that we should be doing plenty more than we are at present about this major threat to our war effort.

ASELMEYER, A. J. Civilian Measures for the Control of Venereal Diseases in World War II. *J.A.M.A.* 120, 12:880 (Nov. 21), 1942.

Sick Cats and Pneumonia—Speaking of virus pneumonias—as who isn't these days—it seems that cats, too, are succumbing to an epidemic caused by a virus (but one that cannot pass through filters, resembling in this respect the elementary bodies of psittacosis). A number of instances of contact between sick cats and people

who have developed atypical pneumonia have been noted.

BAKER, J. A. A Virus Obtained from a Pneumonia of Cats and Its Possible Cause of Atypical Pneumonia in Man. *Science*. 96, 2499:475 (Nov. 20), 1942.

Miscellaneous Notes on Whooping Cough—Pertussis antitoxin can prevent whooping cough if given prior to the onset of coughing, but is of little value once the "whoop" is on. Nasopharyngeal cultures are superior to cough plates as diagnostic aids. These are only two of many important findings reported in a series of three related papers, published together.

BULLOWA, J. G. M., *et al.* Pertussis Immunity with Toxin and Antitoxin; (and) BROOKS, A. M., *et al.* The Method of Nasopharyngeal Culture in the Diagnosis of Whooping Cough. *J.A.M.A.* 120, 12:886 (Nov. 21), 1942.

Epidemiologic Note—Incubation periods in 37 attacks of poliomyelitis varied from 5 to 35 days and averaged 12.2. plus or minus 1.1 days.

CASEY, A. E. The Incubation Period in Epidemic Poliomyelitis. *J.A.M.A.* 120, 11:805 (Nov. 14), 1942.

As Doctors Become Scarce—For a half million farm people, the Farm Security Administration's medical care program has brought medical and hospital services within the range of thin, rural pocketbooks. If the plan is found practical in that obviously difficult situation, it would seem worth studying for its possibilities for adaptation to the millions of urban people who also need medical care.

GODING, H. K. Better Health for Farm Families. *Pub. Health Nurs.* 34, 11:616 (Nov.), 1942.

Educators Please Note—Breaking a self-imposed rule about direct quotes, here are five for your edification: "When the people were shown it was unprofitable to tolerate tuberculosis, something was done—and done in a

hurry." "The public was not interested in tuberculosis, it was not interested in health; it was interested in the cost of the disease." "The change in emphasis from 'a clean tooth never decays' to 'improving beauty and attractiveness through good teeth' sent untold numbers of young and old to dentists." "This thought influenced people because they were interested in beauty and not health (or truth)." "There appears to be valid reason for challenging interest in health as even an important reason for healthy practices."

GUDAKUNST, D. W. The Interest of the Public in Health. *Canad. Pub. Health J.* 33, 10:490 (Oct.), 1942.

Feeding Our Neglected Toddlers—Number nineteen in an outstanding series of articles on nutrition (referred to in this bibliography at the beginning) this paper on infant feeding demands that it be called pointedly to your attention. Though we have done reasonably well nutritionally by our babies, we're not doing right by those past infancy, concludes this author.

JEANS, P. C. The Feeding of Healthy Infants and Children. *J.A.M.A.* 120, 12:913 (Nov. 21), 1942.

Colleges with TB Case Finding—Minnesota, Western Reserve, Yale, Michigan, Vassar, Pennsylvania began it. Now more and more colleges are doing something about tuberculosis, the leading cause of death of college age women and men. There is, however, still a widespread neglect of this health administrative essential among our institutions of so-called higher education.

LIGHT, C. E. Tuberculosis in College Students. *Am. Rev. Tuberc.* 46, 3:227 (Sept.), 1942.

Balm for Smoking Mothers—Nicotine was found to be excreted in the milk of all mothers who smoke

cigarettes, but the amounts were so small that there was no demonstrable effect upon the nurslings. As so few mothers can be induced to nurse their babies nowadays, this reassuring finding is of less moment than it would have been with the breast feeding practices of a generation ago.

PERLMAN, H. H., *et al.* The Excretion of Nicotine in Breast Milk and Urine from Cigarette Smoking. *J.A.M.A.* 120, 13:1003 (Nov. 28), 1942.

Public Health's Step-Child—Thirty-nine varieties of state cancer control programs were tabulated and summarized. Only about a million and a quarter dollars seem to have been expended last year on this still largely neglected service, but interest in doing something increases.

SCHEELE, L. A. Present Status of State Cancer Control Programs. *Pub. Health Rep.* 57, 43:1599 (Oct. 23), 1942.

For Distant-visioned Health Officers—Care of the aged being about the last thing on the conscience of most health workers today, you may question the utility of including articles on geriatrics in this bibliography. However, the subject is brought to your attention from time to time because of the hunch that it is destined some day to become an important part of health administration. This paper points out that healthy old people can serve in industry as substitutes for absent soldiers.

THEWLIS, M. W. Care of the Aged. *J.A.M.A.* 120, 10:749 (Nov. 7), 1942.

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GOOD NUTRITION FOR EVERYBODY. By L. Jean Bogert. Chicago: University of Chicago Press, 1942. 165 pp. Price, \$1.50.

HOW TO TEACH NUTRITION TO CHILDREN. By Mary Pfaffmann and Frances Stern. New York: M. Barrows, 1942. 224 pp. Price, \$2.00.

COMMUNITY WORKSHOPS FOR TEACHERS IN THE MICHIGAN COMMUNITY HEALTH PROJECT. By Henry J. Otto, *et al.* Ann Arbor: University of Michigan Press, 1942. 303 pp. Price, \$2.00.

PUBLICITY: HOW TO PLAN, PRODUCE AND PLACE IT. By Herbert M. Baus. New York: Harper, 1942. 252 pp. Price, \$3.00.

MENTAL ILLNESS: A GUIDE FOR THE FAMILY. By Edith M. Stern with collaboration of Samuel W. Hamilton. New York: Commonwealth, 1942. 134 pp. Price, \$1.00.

MENTAL HEALTH IN COLLEGE. By Clements Fry. New York: Commonwealth, 1942. 365 pp. Price, \$2.00.

THE ROAD TO GOOD NUTRITION. By Lydia J. Roberts. Washington: Government Printing Office, Bureau Publication No. 270. 54 pp. Price, \$15.

THIS IS MY LIFE. By Agnes Hunt. New York: Putnam, 1942. 237 pp. Price, \$2.50.

EXTRA-MURAL TEACHING OF PREVENTIVE MEDICINE AND PUBLIC HEALTH. By Alfred

Korach. Cincinnati: The Medical Bulletin of the University of Cincinnati, Vol. IX, 1942. 143 pp.

POPULAR SCIENCE TALKS. Vol. XIV. Science in War. Philadelphia: *American Journal of Pharmacy*, 1942. 97 pp. Price, \$1.00.

A VENTURE IN PUBLIC HEALTH INTEGRATION. The 1941 Health Education Conference of the New York Academy of Medicine. New York: Columbia University Press, 1942. 56 pp. Price, \$1.00.

JULIUS ROSENWALD FUND. Review for the Two-Year Period, 1940-1942. By Edwin R. Embree. Chicago, 1942.

OPPORTUNITIES FOR THE PREPARATION OF TEACHERS IN HEALTH. A Survey of 20 Teachers Colleges. By Earl E. Kleinschmidt. Bulletin 1942, No. 1. Washington: Government Printing Office, 1942. 117 pp. Price, \$20.

FACTS ABOUT NURSING, 1942. The Nursing Information Bureau of the American Nurses' Association, New York. 41 pp. Price, \$25.

GUARDING OF HEALTH OF BALTIMORE—1941. A Summary of the One Hundred and Twenty-Seventh Annual Report of the City Health Department.

PROCEEDINGS OF THE EIGHTH AMERICAN SCIENTIFIC CONGRESS. Vol. VI. Public Health and Medicine. Washington: Department of State, 1942.

ASSOCIATION NEWS

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 Frank E. Nelson, Ph.D., Bacteriology Dept., Kansas State College, Manhattan, Kans., Assoc. Prof. of Bacteriology
 David F. Rogers, A.B., Monsanto Chemical Co., 1700 S. Second St., St. Louis, Mo., Bacteriologist
 Mary R. Smith, M.S., State Dept. of Health Laboratory, Oklahoma City, Okla., Bacteriologist
 Edward A. Steinhaus, Ph.D., Rocky Mountain Lab., U. S. Public Health Service, Hamilton, Mont., Assoc. Bacteriologist
 Virginia Tlappek, M.S., DeGiverville Ave., St. Louis, Mo., Bacteriologist, St. Louis Health Division
 Louis H. Weiner, B.S., 3638 Broadway, Chicago, Ill., Director of Laboratory, The Borden Co., Chicago Milk Div.
 William A. Womer, M.D., Dept. of Health, New Castle, Pa., Director, Health Dept.

Vital Statistics Section

Raymond S. Behrle, 405-608 S. Dearborn St.,

- Chicago, Ill., Representative, Haloid Company
- Bertram J. Black, M.S., 519 Smithfield St., Pittsburgh, Pa., Director, Bureau of Social Research, Federation of Social Agencies of Pittsburgh and Allegheny County
- Carl L. Erhardt, B.A., 69 Grant Ave., Brooklyn, N. Y., Asst. to Registrar of Records, New York City Dept. of Health
- Irving V. Sollins, Ph.D., 54 W. Hubbard St., Chicago, Ill., Senior Public Health Representative, U. S. Public Health Service

Engineering Section

- Pedro P. Azpurua Q, Este 8 No. 123, Caracas, Venezuela, S. A., Engineer, Compania Anomma Riego
- Robert R. Cunningham, B.S., 131½ S. Side Square, Macomb, Ill., Asst. Sanitary Engineer, State Dept. of Public Health
- Robert W. Eddy, B.S., 511 N. 11th St., Lawrenceville, Ill., Sanitary Engineer, Lawrence County Health Dept.
- Richard J. Hammerstrom, B.S., Tulane Univ., Sch. of Med., New Orleans, La., Instructor of Preventive Medicine
- Dorothy Baumes Phelps, M.S., 335 State Office Bldg., Providence, R. I., Sanitary Bacteriologist, State Dept. of Health
- Verdun Randolph, B.S., State Dept. of Public Health, Div. of San. Eng., Springfield, Ill., Sanitary Engineer
- Wilfred K. Rodman, M.S., Box 511, Salem, Mo., Dist. Public Health Engineer

Industrial Hygiene Section

- Clyde M. Berry, Ph.D., State Board of Health, Raleigh, N. C., Asst. Sanitary Engineer (R), U. S. Public Health Service
- Lester V. Cralley, Ph.D., National Institute of Health, Div. of Industrial Hygiene, Bethesda, Md., Asst. Sanitary Engineer (R), U. S. Public Health Service
- David S. Falk, B.S., 1320 Westview Ave., East Lansing, Mich., Ventilation Engineer, Bureau of Industrial Hygiene, State Dept. of Health
- Roberts A. Hearn, M.D., State Health Dept., Little Rock, Ark., Director, Div. of Industrial Hygiene
- Pope A. Lawrence, M.S., 303 E. 10th St., Austin, Tex., Industrial Hygiene Engineer, State Dept. of Health
- Christopher Leggo, M.D., Municipal Courts Bldg., Room 62, St. Louis, Mo., Industrial Hygiene Physician, State Board of Health
- Morgan B. Lewman, 620 S. Third St., Louisville, Ky., Industrial Hygiene Engineer, State Dept. of Health

Food and Nutrition Section

- French Boyd, B.S., 19 Sycamore St., Mooresville, N. C., Consultant, Office of Defense Health and Welfare Services
- Winthrop F. Bronson, A.B., 8321 Drexel Ave., Chicago, Ill.
- Edward J. Czarnetzky, Ph.D., Wilson and Co., 4100 Ashland Ave., Chicago, Ill., Biologist
- Agnes Erkel, B.S., 2258 Knapp St., St. Paul, Minn., Nutritionist, Family Nursing Service
- Cecile S. Hambleton, P. O. Box 1046, Alexandria, Va., Student, William and Mary College
- Thomas C. M. Larsen, State Board of Health, Topeka, Kans., Chief, Milk Sanitation, State Board of Health
- Major Victor E. Levine, M.C., O'Reilly General Hospital, U. S. A., Springfield, Mo.
- Mary Reeves, State Board of Health, Jefferson City, Mo., Nutrition Consultant
- Anna Smrha, B.S., State Dept. of Health, Lincoln, Nebr., Public Health Nutritionist

Maternal and Child Health Section

- Chester J. Antos, M.D., State Board of Health, Jefferson City, Mo., Pediatric Consultant
- John F. Belz, M.D., 3115 N.E. 41st Ave., Portland, Ore., Maternal and Child Health Director, State Board of Health
- Alice D. Chenoweth-Pate, M.D., Cumberland Apts., Louisville, Ky., Director, Div. of Maternal and Child Health, State Dept. of Health
- Lee O. Frech, M.D., 250 North Water, Decatur, Ill., Pediatrician, State Dept. of Public Health
- Paul R. Gerhardt, M.D., P. O. Box 749, Charleston, W. Va., Chief, Bureau of Medical Services, State Dept. of Public Assistance
- Henrietta Herbolzheimer, M.D., 606 S. Fourth St., Springfield, Ill., Field Consultant in Maternity and Infancy, State Health Dept.
- Lenore Patrick, M.D., State Dept. of Health, Charleston, W. Va., Director, Maternal and Child Health

Public Health Education Section

- Marvin F. Carter, 879 Madison St., Memphis, Tenn., Director, Health Education, Memphis-Shelby County Health Dept.
- Ruth E. Heltenen, B.S., 7470 Byron, Detroit, Mich., Social Director and Instructor of Health and Hygiene, Ford Hospital School of Nursing
- Mary C. Leo, A.B., State House, Augusta, Me., Director, Civilian Health Education, State Bureau of Health
- Albertaine P. McKellar, B.S., Cumberland County Health Dept., Fayetteville, N. C., Asst. Consultant in Health Education, U. S. Public Health Service

Myrtle H. Miller, R.N., 401 Estelle, Ferguson, Mo., Staff Nurse, St. Louis County Health Dept.

Cornelia Mulder, Community Service Center, Flint, Mich., Health Educator, Flint Board of Education

Egbert W. Neidig, M.A., 51 Warren Ave. West, Detroit, Mich., Secretary, Health Council of Metropolitan Detroit

Paul A. Teschner, M.D., 535 N. Dearborn, Chicago, Ill., Asst. Director, Bureau of Health Education, American Medical Assn.

Public Health Nursing Section

Frances S. Buck, B.S., R.N., 2411 N. Charles St., Baltimore, Md., Public Health Nursing Consultant, State Dept. of Health

Mary C. Carne, R.N., 124 N. Patrick St., Alexandria, Va., Supervisor of Public Health Nurses, Alexandria Health Dept.

Beatrice M. Clutch, M.A., George Peabody College, Nashville, Tenn., Assoc. Prof. of Public Health Nursing

Sarah E. Daily, R.N., 251 S. Maffit St., Decatur, Ill., Dist. Supervising Nurse, State Dept. of Public Health

Berenice C. Gardner, B.S., 1709 Washington St., St. Louis, Mo., Nursing Consultant, American Red Cross

Sophia A. Jarc, B.S. in N., N. Y. State Dept. of Health, Albany, N. Y., Public Health Nursing Educational Consultant

Lillian Jeffers, 904 S. Second St., Springfield, Ill., Maternity Supervisor, State Dept. of Health

Mary A. Keenan, R.N., 720 Reisch Bldg., Springfield, Ill., Unit Nurse, State Dept. of Public Health

Virginia E. Knott, R.N., 28 S. Illinois Ave., Villa Park, Ill., Supervising Nurse, DuPage County Health Dept.

Katharine M. Kreizenbeck-Leenhouts, Main St., Mechanicsburg, Ill., Asst. Supervising Nurse, Div. of Public Health Nursing, State Dept. of Public Health

M. Joyce Leslie, Box 1008, Port Alberni, B. C., Canada, Public Health Nurse, Port Alberni Public Health Centre

Mary Ann MacKay, B.S., 204 City Hall, Peoria, Ill., Supt., Visiting Nurse Assn.

Jean E. McNee, Peabody College, Nashville, Tenn., Asst. Prof. in Public Health Nursing

Edna L. Moorhouse, M.A., Main St., New City, N. Y., Supervising Public Health Nurse, State Dept. of Health

Leora R. Neal, R.N., 1906 W. DuBois, Lawrenceville, Ill., Supervising Nurse, Lawrence County Dept. of Public Health

Hazel A. Nordley, Box 387, Crandon, Wis., Public Health Nurse, State Board of Health

Margaret Reid, B.S., 235 E. 22nd St., New

York, N. Y., Education Director, Metropolitan Life Ins. Co.

Edna B. Robinson, P. O. Box 1192, Concord, Calif., Supervising Nurse, Contra Costa County Health Dept.

A. Mary Ross, 3408 Kenwood, Kansas City, Mo., Supervisor and School Nurse, Board of Education

Mary J. Ross, 5660 Kingsbury Blvd., St. Louis, Mo., School Nurse, School District City of LaDue, Mo.

Marguerite D. Rowland, 107 W. Mason Ave., Alexandria, Va., Staff Nurse, Alexandria Health Dept.

Emma Sater, B.S., 210 Corby Bldg., St. Joseph, Mo., Director, St. Joseph Organization for Public Health Nursing

Leone W. Ware, 2020 South Park Ave., Springfield, Ill., Asst. Supervising Nurse, State Dept. of Public Health

Epidemiology Section

Francisco E. Ortega-Canet, M.D., San Lazaro 1212 (altos), Habana, Cuba, Comisionado de Salubridad Publica, Ministerio de Salubridad y Ast. Soc.

William A. Davis, M.D., M.P.H., 331 E. 71st St., New York, N. Y., Staff Member, International Health Division, Rockefeller Foundation

Harry Goldman, M.D., M.P.H., 259 Hanover St., Boston, Mass., Deputy Commissioner, Boston Health Dept.

Ruth L. Green, A.B., 909 McKinley Ave., Oakland, Calif., Junior Public Health Analyst, Oakland Health Dept.

David S. Ruhe, M.D., 840 Cherry St., 605 Volunteer Bldg., Atlanta, Ga., Asst. Surgeon, U. S. Public Health Service

Unaffiliated

Max Gross, M.D., 109 States Ave., Atlantic City, N. J., Director of Tuberculosis Clinics for State of New Jersey

Jerome R. Mulconnery, D.D.S., 325 E. Broadway, East St. Louis, Ill., Dentist, East Side Health Dist.

DECEASED MEMBERS

LeRoy A. Wilkes, M.D., Trenton, N. J., Elected Member 1919, Maternal and Child Health Section

Horton R. Casparis, M.D., Nashville, Tenn., Elected Member 1941, Maternal and Child Health Section

E. G. Buckland, New Haven, Conn., Elected Member 1920, Health Officers Section

S. S. Goldwater, M.D., New York, N. Y., Elected Member 1902, Elected Fellow 1922, Charter Fellow, Maternal and Child Health Section

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

U. S. CIVIL SERVICE COMMISSION. Public Health Nursing Consultants, 5 grades. See November *American Journal of Public Health*, or write U. S. Public Health Service, Washington, D. C.

Merit System Council, Oregon State Board of Health and Crippled Children's Division, has announced merit examinations in practically all public health fields. See November *American Journal of Public Health*, or write H. J. Sears, Merit System Supervisor, P. O. Box 88, Portland, Ore.

Indiana State Personnel Division announces that applications may be filed for positions in orthopedic nursing, medical positions (5 classes), and local public health director. See November *American Journal of Public Health*, or write Indiana State Personnel Division, 141 South Meridian Street, Indianapolis, Ind.

Physician, man or woman, as director of Division of Maternal, Child and School Hygiene in southern city department of health. Woman physician with pediatric training preferred, public health experience not essential. To operate prenatal, infant and preschool clinics and promote school health program. Salary commensurate with ability and qualifications of applicant. Apply Box J, Employment Service, A.P.H.A.

Southern state department of health seeks several obstetric and pediatric consultants, requiring a minimum of a year's residency in a specialty, immunity to draft and preferably training in public health. Men and women are eligible. Salary \$300 per month plus travel. Apply Box C, Employment Service, A.P.H.A.

Public Health Engineer and director of Division of Sanitation of a city and county health unit; population 145,000 in the Midwest. Salary \$3,180 and travel allowance. Box E, Employment Service, A.P.H.A.

The Flint Civil Service Commission will consider applications for Executive Health Officer of the Flint Department of Health. Applicants must be medical graduates with a valid license to practise

medicine in Michigan or eligibility for such license; also must have practised medicine and surgery for five or more years and had considerable experience in public health work. There will be no written test, qualifications being judged solely from review of experience, education and training and an oral examination. Present incumbent is on military leave of absence under circumstances which will probably extend for a period of five years. Staff consists of over fifty professional and technically trained employees. Probable salary \$5,400. Inquiries should be directed to Foster B. Roser, Director, Flint Civil Service Commission, City Hall, Flint, Mich.

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

Public health nurses wanted for two-county unit in Michigan. Must be graduates with minimum of 4 months' public health training or 8 months' training under supervision. Salary \$1,800 per year with travel allowance \$35 to \$41 per month. Must drive and own a car. Address Dr. Koupal, Director Alger-Schoolcraft Health Dept., Manistique, Mich.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sana-

toria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

M.D., Dr.P.H., interested mental and industrial hygiene, chief of mental hygiene clinic, on staff of psychiatric hospital, speaker, writer, author of books on health, diplomate in psychiatry, professor of psychiatry. Ineligible for military service because of age, healthy, vigorous, able to

work hard, now in private practice; would make sacrifice and accept decent but lower remuneration than present income if he could be employed in war industry, preferably New York, New Jersey, or Connecticut. United States citizen. Had important government job in last war. Speaks and writes several languages. A-504.

NEWS FROM THE FIELD

IMPROVEMENT IN THE TEACHING OF TROPICAL MEDICINE IN MEDICAL SCHOOLS

THE John and Mary R. Markle Foundation has appropriated \$25,000 to the Association of American Medical Colleges to finance a program for the improvement of teaching tropical medicine in the medical schools in the United States and Canada. The development of of this plan has been placed in the hands of a Committee on Tropical Medicine of the association consisting of Henry E. Meleney, M.D., New York University, Chairman, Malcolm H. Soule, Sc.D., University of Michigan, and Hiram W. Kostmayer, M.D., Tulane University. The plan consists of offering to each medical school an opportunity for two members of its teaching staff to attend a 2 months' course in tropical medicine beginning January 4, 1943.

The Surgeon General of the Army has given permission for one representative from each school to attend the course in tropical medicine being given to medical officers at the Army Medical School, Washington, D. C. This course consists of a broad survey of tropical medicine, and is intended for clinical instructors in medical schools.

The Department of Tropical Medicine of Tulane University has agreed to give a special course in tropical medicine in which particular emphasis will be placed upon the laboratory diagnosis, pathology, clinical aspects, and prevention of tropical diseases. This course is intended particularly for physicians who will teach the laboratory aspects of tropical diseases.

Each of these courses can accommodate thirty instructors from medical schools. Travel and living expenses and, in the case of the Tulane Course, a

tuition fee, will be paid from the appropriation of the Markle Foundation. The Deans of medical schools have been asked to nominate instructors to attend these courses, and the response indicates that each course will have a maximum attendance. Preference will be given to the schools whose instructors are now least well prepared to teach tropical medicine.

It is recognized that there is also great need for instructors in medical schools to obtain practical experience in tropical medicine. Preliminary inquiry indicates that such experience can probably be provided in the American tropics later during the coming year. Candidates for such practical experience would be selected from among those who had completed the course at the Army Medical School or Tulane, and other instructors who have had academic training but not field experience in tropical medicine.

The committee of the Association of American Medical Colleges has also interested itself in the collection of teaching specimens and material for the teaching of parasitic and other tropical diseases in medical schools. The Army Medical School, with the coöperation of the National Institute of Health and other institutions, is developing a Distributing Center for such material. Information concerning this Distributing Center is being sent to the medical schools with instruction for the procurement of material either locally or from the Center. It is expected that in addition to laboratory specimens of animal parasites, there may be available certain charts, lantern slides, and motion pictures.

The office of the Surgeon General of the Army has offered to make available to medical schools information which has been collected on the distribution of tropical diseases throughout the world. Plans for editing this material are in progress, and it is expected that maps will also be prepared, and made available to medical schools, showing the world distribution of the important tropical diseases. The Markle Foundation has made an additional appropriation of \$3,000 to the National Research Council for the preparation of this material.

FACTS ABOUT NURSING, 1942

A convenient source book for those who deal with the broader aspects of nursing, especially in their relation to the nation's war effort, has been issued by the Nursing Information Bureau of the American Nurses' Association, 1790 Broadway, New York, N. Y.

Included among the timely data are the number of nurses serving in military, other government and voluntary hospitals and agencies; the number of nurses needed; the number of students enrolled in nursing schools; the distribution of federal funds for nursing education; salary ranges; and the number of auxiliary workers in nursing services. The pamphlet may be ordered from the Book Service, A.P.H.A., at 25¢.

NEW INDUSTRIAL HYGIENE DIVISION IN WASHINGTON STATE

Announcement has been made of the establishment on October 1 of a new Division of Industrial Hygiene in the Washington State Department of Health with offices in Seattle. This was made possible through a coöperative venture with the U. S. Public Health Service.

CHANGES IN ILLINOIS HEALTH UNITS

The Illinois State Department of Health, Roland R. Cross, M.D., Direc-

tor, has announced that four of the Illinois counties designated as health defense zones have recently extended essential local health services throughout the entire zone to take charge of the new county-wide projects set up for the duration of the war. H. O. Collins, M.D., of the Quincy Public Health District, has been appointed defense zone health officer for Adams County, R. C. Farrier, M.D., of the East Side Health District as defense zone health officer for St. Clair County, and N. O. Gundersen, M.D., of the Rockford Health Department for Winnebago County, with Sumner Miller, M.D., of the Peoria City Health Department serving for Peoria County.

This raises to 11 the number of Illinois health defense counties in which state-subsidized local health service is now continuously provided. The state will contribute additional trained personnel to work under the supervision of the newly commissioned medical health officers as has already been done in the counties of Cook, DuPage, Lawrence, Lee, Morgan, Will, and Williamson.

The other 19 Illinois counties which are at present eligible for this service by virtue of their designation as health defense zones are Carrol, Champaign, De Kalb, Edgar, Fulton, Henderson, Kane, Kankakee, Knox, Lake, La Salle, McDonough, Macon, Madison, Marion, Rock Island, Sangamon, Tazewell, and Vermilion.

According to the *Illinois Health Messenger*, of the 91 Illinois counties which at present have no full-time county-wide local health service, 72 are entirely without recourse under existing Illinois law to any legal means of establishing such service.

"QUALIFICATIONS AND CLASSIFICATION OF PUBLIC HEALTH ENGINEERING PERSONNEL"

A report under the above title was presented at St. Louis before the Con-

ference of Municipal Public Health Engineers. It has been suggested by the Section officers of the Engineering Section, A.P.H.A., that the conclusions are worthy of publication. In brief they are as follows:

1. That the report of the A.P.H.A. on qualifications of personnel engaged in the field of environmental sanitation is acceptable.

2. That there should be three main categories of these workers, (a) public health or sanitary engineers, including only those having professional engineering degrees or their equivalent, (b) sanitarians, who may be non-engineering but technical employees working under engineering direction, (c) sanitary inspectors, a title to be applied to those in health department employment who are without adequate prior training or qualifications.

The committee is impressed with the necessity of providing classes of personnel below the level of public health (or sanitary) engineers. They recommend (1) the placing of these non-engineering groups under engineering direction, (2) raising their educational level by in-service training, and by replacement and addition of fully qualified persons, and (3) the achievement of a rational and uniform system of titles in place of the present haphazard designations inherited from the past.

SEVENTH ANNUAL MEETING OF THE INDUSTRIAL HYGIENE FOUNDATION

The Industrial Hygiene Foundation of Pittsburgh recently held its 7th Annual Meeting at the Mellon Institute. The purpose of the Foundation, which is a non-profit association of mining and manufacturing concerns, is to protect the health of industrial workers.

John F. McMahon was appointed Managing Director of the Foundation, succeeding Dr. H. B. Meller who has retired from active management because of ill health. Dr. Meller will continue as consultant.

More than 500 representatives from some 200 industrial concerns and a number of governmental agencies attended the annual meeting, which had for its theme Keep War Workers Well. Andrew Fletcher of New York was re-elected Chairman of the Board and new

members of the Board of Trustees included Ned H. Dearborn, Ph.D., Executive Vice President, National Safety Council, Chicago; Professor Philip Drinker, Harvard School of Public Health, Boston; Lt. Col. A. J. Lanza, M.C., A.U.S., Chief, Occupational Hygiene Branch, and C. D. Selby, M.D., Medical Consultant, General Motors Corporation.

"LESSONS FROM BRITISH EXPERIENCE IN CIVIL DEFENSE"

George Baehr, M.D., Chief Medical Officer of the Office of Civilian Defense, Washington, has recently reported the following observations made on a recent inspection of emergency medical facilities in England and Scotland. These are summarized from *Medical Series Circular No. 20* of the O.C.D.

1. Heavy raids occur invariably at night, bombs now have much greater destructive effect, incendiary bombs are used in much larger numbers and fire is now the most serious hazard.

2. In large cities the field casualty services may handle more than 2,500 casualties during a night raid. All serious casualties are moved directly to hospitals and never to first-aid posts. Heavy raids are apt to be repeated on subsequent nights when the protective forces are exhausted.

3. A large fleet of four-stretcher ambulances is essential for life saving. These could be simply made from used passenger cars on which is mounted a simple ambulance body. The use of trucks has proven unsatisfactory, being absorbed for other purposes, and frequently not reaching the scene of accident.

4. Casualty stations staffed by one or two doctors, several nurses and a variable number of aides and auxiliaries are necessary at or near all hospitals and at places more than a mile from hospitals to care for minor casualties which do not require hospitalization. Many of these are now on a care-and-maintenance basis and are activated only during the raids.

5. In large cities casualty stations need not be more numerous than 1 per 25,000 inhabitants. They should be located about a mile apart. Many of the minor casualties are moved to first-aid posts in sitting-case cars; some walk.

6. First-aid parties or stretcher teams are

not necessary, are a waste of man power and are rapidly being eliminated in England. First-aid at incidents is essentially a function of the rescue parties which extricate casualties from under the debris of demolished buildings. All first-aid parties are being merged into rescue parties. They include a leader, assistant leader and 8 other members and are entirely independent of the fire department. They are a life-saving service related to the medical services concerned in field casualty work.

7. It is necessary to revise the concept underlying first-aid. Almost all raids occur at night, the victims are crushed under the debris of demolished buildings and are either dead or severely injured. Less than a third are slightly injured and can be cared for at casualty stations.

8. Wounds are usually grossly contaminated and need only be covered with a shell dressing until the casualty reaches the hospital. Hemorrhage is usually controllable with a pressure dressing, the tourniquet is rarely employed. Burns are covered only with sterile gauze until the casualty arrives at the hospital. Tannic acid jelly as a first-aid dressing for burns has been discarded because of the dirt which invariably contaminates the burned surface, because the jelly deteriorates rapidly and because tannic acid ignites in the presence of phosphorus when applied to burns caused by the explosion of phosphorus-oil bombs.

9. Traction splints are not used except when the casualty must be transported a long distance over country roads. The darkness and conditions of an air raid make hurried application difficult or impossible.

10. Shock is treated at the incident by prompt administration of adequate doses of morphine, coramine, proper blanketing, administration of fluids and the use of hot water bottles. The use of plasma or blood transfusion is deferred until arrival at the hospital.

11. The presence of a physician at the incident is invaluable but more than one is unnecessary. Physicians with a staff of nurses may supervise more than one incident.

12. The load of casualties is so distributed that even in heavy raids large hospitals rarely receive more than 50 to 100 casualties.

13. A large casualty receiving hospital is often related to one or more peripheral hospitals in the suburbs or in a country district. There are now four base hospital beds for each casualty bed in the cities.

14. On notification that casualties have occurred an express party is immediately dispatched consisting of one rescue first-aid party, one ambulance, one sitting-case car and

one mobile medical unit, the latter consisting of one physician, one nurse and two auxiliaries. In this manner useless movement is avoided and equipment and personnel of the community is carefully conserved.

POSTGRADUATE COURSE IN INDUSTRIAL HYGIENE AT PHILADELPHIA

An 8 weeks postgraduate course in industrial hygiene and medicine has been announced to begin January 5 at the Philadelphia County Medical Society under the auspices of the Committees on Industrial Health of the Society and the Medical Society of the State of Pennsylvania. The course will be directed jointly by the Departments of Preventive Medicine and Public Health of the University of Pennsylvania and the Woman's Medical College of Pennsylvania. Topics listed for study are The Worker and the Job, Learning the Scope of the Field, Physical Factors, Non-occupational Disease Hazards in Industry, Toxicology and Compensation and Medico-Legal Factors.

ARMED SERVICES SET UP TYPHUS COMMISSION

Secretary Stimson of the U. S. War Department announced on November 19 the creation of the United States of America Typhus Commission which is made up of four persons under the chairmanship of Rear Admiral Charles S. Stephenson, Medical Corps, U.S.N. The other members are Lieut. Col. Harry Plotz, Medical Corps, A.U.S., Senior Surgeon Adolph Runreich, Public Health Service, and Major John C. Snyder, Medical Corps, A.U.S.

SOCIAL HYGIENE DAY, 1943

Walter Clarke, M.D., Executive Director of the American Social Hygiene Association, New York, has announced the annual observance of Social Hygiene Day, scheduled for Wednesday, February 3, 1943.

Since the roots of syphilis and gonorrhea are in the home front, Dr. Clarke

pointed out that the observance of Social Hygiene Day would assume more significance than before. He recalled that total absences from duty during the first world war from these infections kept the equivalent of 20,600 men out of the fighting for an entire year. These are the equivalent of the personnel required to man five aircraft carriers and nine destroyers. In wartime he said that the function of social hygiene organizations is to persuade each community to use our weapons against the venereal diseases effectively.

1942-1943 OFFICERS OF IDAHO PUBLIC HEALTH ASSOCIATION

At its Third Annual Meeting, held in Pocatello October 12 to 13, 1942, the Idaho Public Health Association elected the following new officers:

President—A. H. Christiansen, Boise
1st Vice-President—Stuart Robinson, D.D.S., Gooding
2d Vice-President—Mrs. H. J. Maughan, Preston
3d Vice-President—Mrs. Otto Leuschel, Lewiston
4th Vice-President—Mrs. Emma Cloucheck, Twin Falls
5th Vice-President—John M. Coughlin, M.D., Twin Falls
Secretary—H. C. Clare, Boise
Treasurer—Lucy M. Higgins, Boise

ORAL HEALTH GROUP

The Oral Health Group of the A. P. H. A., in session at St. Louis, Mo., in October, 1942, appointed the following officers:

Chairman—C. R. Taylor, D.D.S., Lansing, Mich.
Secretary—Walter J. Peltón, D.D.S., Washington, D. C.

MICHIGAN PUBLIC HEALTH ASSOCIATION

The Michigan Public Health Association held its 22nd Annual Meeting in Grand Rapids, November 11 to 13, and at that time elected the following new officers to serve for the forthcoming year:

President—Emilie G. Sargent, R.N., Detroit
President-elect—Edward D. Rich, Lansing
Vice-President—C. D. Barrett, M.D., Mason
Secretary-Treasurer—Marjorie Delavan, Lansing
Representative on A.P.H.A. Governing Council—W. R. Davis, D.D.S., Lansing

CONFERENCE OF MUNICIPAL PUBLIC HEALTH ENGINEERS

The new officers of the Conference of Municipal Public Health Engineers are as follows:

Chairman—William T. Ingram, A.B. in C.E., Stockton, Calif.
Vice-Chairman—J. Lloyd Barron, C.E., Roslyn Heights, N. Y.
Secretary-Treasurer—Charles Senn, Milwaukee, Wis.
Executive Committee:
 Charles M. Davidson, Louisville, Ky. (1943)
 Alan C. Love, Waco, Tex. (1943)
 Aime Cousineau, Montreal, Can. (1944)
 Leonard Board, C.E., Clayton, Mo. (1944)
 Sol Pincus, C.E., New York, N. Y. (1945)
 Alfred H. Fletcher, Baltimore, Md. (1945)

FORTY-SEVEN DEATHS FROM POISONING IN OREGON STATE HOSPITAL

The press on November 19 and 20 carried dispatches from Salem, Ore., indicating that 47 patients at the Oregon State Hospital for the Insane out of 467 served at an evening meal had died from a poison suspected of being sodium fluoride.

It is stated that all of the patients who ate the meal became ill and that symptoms included nausea, stomach cramps, and paralysis of the legs, with evidence of respiratory paralysis. Studies of the food indicated that rats fed on the eggs taken from the plates of the diners died within a few minutes, though they were not killed by eating eggs from the cans of frozen egg yolk which had been used for the meal. It was suspected that the fluoride had been put into the mixture during preparation in the institution. The first patient died within an hour of the meal and within 6 hours 32 had died.

As a result of the report the Depart-

ment of Agriculture halted further distribution of frozen eggs through its regional offices, pending the conclusion of the investigation at Salem.

TRANSPARENT MAN COMES TO CLEVELAND

Dr. Bruno Gebhard, Director of the Cleveland Health Museum, announces that, through the generosity of Louis I. Dublin, Ph.D., and Homer N. Calver of the American Museum of Health, the Cleveland Health Museum will show during the coming year most of the main items of the former Hall of Man and Medicine of the New York World's Fair. This material includes many items of the Oberlaender Trust Collection, such as the Transparent Man, and others. Public announcement of these exhibits was made at the Second Anniversary Luncheon of the Health Museum on November 20, where W. W. Peter, M.D., Dr.P.H., Associate Professor of Public Health at Yale University, was the speaker on "Keep the Home Fires Burning."

PAUL O. KOMORA IN NEW YORK STATE DEPARTMENT OF MENTAL HYGIENE

Paul O. Komora, associate secretary of the National Committee for Mental Hygiene since 1932, has resigned from that organization to become assistant secretary of the New York State Department of Mental Hygiene at Albany. He was associated with the National Committee for many years, having served as secretary to Dr. Thomas W. Salmon, first medical director of the committee, and later as educational publicity director, editor, research worker, and assistant to Clifford W. Beers, founder of the organization, in the administration of its corporate affairs. The board of directors recently tendered him a testimonial dinner in observance of his 25 years of service with the committee and as a "send off" to his new post, at which Dr. Adolf Meyer presided and

his friends and associates, including many distinguished psychiatrists, paid him tributes.

Mr. Komora served in the psychiatric organization in the U. S. Army in France during the first world war, helped to organize the First International Congress on Mental Hygiene held in Washington in 1930, directed the public relations work of the American Psychiatric Association and the American Orthopsychiatric Association at many of their conventions, and served as administrative secretary of the notable symposium on mental health conducted by the American Association for the Advancement of Science at Richmond, Va., in 1938. He is the author of various articles and reports in this field of public health.

In his new position, Mr. Komora enters upon duties and responsibilities comparable to his previous activities but adapted to the requirements of public service in one of the largest departments of government in a state that has long exercised leadership in the field of mental hygiene. In the major phases of his work he will be engaged in the administrative relationships of the department with the 26 institutions for the mentally sick and defective under its supervision, with other state departments as well as private institutions and agencies active in mental health and social welfare work, and with the public. There are over 100,000 patients in the institutions of the Department of Mental Hygiene. To care for and properly treat this large body of patients requires the services of nearly 500 physicians, over 12,000 ward employees, and over 6,000 other employees. To maintain these patients requires an annual expenditure of approximately \$36,000,000.

FIFTH ANNUAL CONGRESS ON INDUSTRIAL HEALTH

The Council on Industrial Health of the American Medical Association has

announced through the Secretary, Carl M. Peterson, M.D., that the Fifth Annual Congress on Industrial Health, under the sponsorship of the Council, will be held January 11-13 at the Palmer House, Chicago. The meetings are open to physicians and others interested in industrial health. There is no registration fee. The preliminary program can be found on pages 1145-1146 of the *Journal of the American Medical Association*, December 5, 1942.

PROGRESS IN DEFINING STANDARDS FOR TOXIC DUSTS AND GASES

The American Public Health Association is represented on the Committee on Allowable Concentrations of Toxic Dusts and Gases—Z. 37, of the American Standards Association, by J. J. Bloomfield of the National Institute of Health, Bethesda, Md. Mr. Bloomfield's recent progress report on the work of this committee indicates that the proposed American Standard Allowable Concentration of Chromic Acid and Chromates has been approved and will receive early publication. Similar action was taken on the proposed Standard for Mercury.

The committee is currently considering action on standards for Nitrous Gases, for Arsenic, for Carbon Tetrachloride, Lead, Xylol, Formaldehyde, Hydrofluoric Acid, Methanol, Silica, Toluene and Trichlorethylene. The committee has decided for the present not to attempt standards on Antimony and Zinc.

INDUSTRIAL MEDICINE COURSE AT LONG ISLAND COLLEGE OF MEDICINE

Thomas D. Dublin, M.D., Associate Professor and head of the Department of Preventive Medicine and Community Health of the Long Island College of Medicine, Brooklyn, N. Y., reports that the two weeks postgraduate course in industrial medicine given at the college during November has been completed.

Fifty-nine physicians, nurses, and industrial observers from six states registered for the course, including the seminars and clinics. Seven of the students were placed as "interns" in medical departments of industrial firms which offered facilities for a month's practical training. These firms included the American Cyanamid Company, the Lowe Paper Company, the Bell Telephone Laboratories, Consolidated Edison Company, and the New York Telephone Company.

NEW HEALTH UNIT IN WASHINGTON

The health departments of Jefferson and Clallam Counties, Washington, have united to form a joint public health district unit, following a conference of the Washington State Department of Health and officials of these counties and the cities of Port Angeles and Port Townsend. The central office will be located at the court house in Port Angeles, with a branch office at Jefferson County court house in Port Townsend. District offices will be located in other sections of the counties.

PERSONALS

Central States

KURT CARL BECKER, M.D., of Troy, Ohio, has resigned as Health Commissioner of Miami County, to enter private practice in Troy. He will be succeeded, as Health Commissioner of Troy and Miami County by HARRY WAIN, M.D., M.S.P.H.,† of Sidney, formerly Health Commissioner for Sidney and Shelby County.

ARTHUR E. GORMAN,* who has been Engineer of Water Purification in Chicago, Ill., was appointed, on August 1, Chief of the Water Production Section, Power Division, War Production Board, Washington, D.

* Fellow A.P.H.A.

† Member A.P.H.A.

C., on leave of absence from the City of Chicago.

FREDERICK G. HALL, M.D., formerly of Galesburg, Ill., has been named Assistant City Health Officer of Long Beach, Calif.

CHARLES E. LYGT, M.D.,* who has been Professor of Health and Physical Education and Director of Student Health Service at Carleton College, Northfield, Minn., has been appointed Director of Health Education of the National Tuberculosis Association in New York, succeeding H. E. KLEINSCHMIDT, M.D.,* who resigned last summer. Dr. Lygt is a graduate of Queens University Faculty of Medicine, Kingston, Ont. He served for 9 years on the faculty of the University of Wisconsin Medical School, being connected with the Department of Student Health. He has been Chairman of the Tuberculosis Committee of the American Student Health Association.

LENORE V. L. PATRICK, M.D.,† of Chipewewa Falls, Wis., formerly with the Wisconsin State Board of Health, has been appointed Chief of the Bureau of Maternal and Child Health of the West Virginia Department of Health.

HERBERT L. PETTITT, M.D., of Morrison, Ill., resigned on October 26 as Assistant Director of the Illinois State Department of Public Health to return to private practice, due, it was stated, to the shortage of physicians in his home city.

NORMAN S. REED, M.D., of Caldwell, Ohio, has been appointed Health Commissioner of Noble County, to succeed EDWARD G. DITCH, M.D., of Caldwell, who entered military service.

THURMAN B. RICE, M.D.,† Health Education Consultant, Indiana State

Board of Health, Indianapolis, has been appointed Acting State Health Commissioner. JOHN W. FERREE, M.D.,* of Indianapolis, has been granted leave of absence as State Health Commissioner, to serve as Lieutenant Commander in the Medical Corps of the U. S. Navy; Dr. Ferree has been State Health Commissioner since October, 1940, and had also served as Chief of the Bureau of Local Health Administration. Dr. Rice, until his recent appointment as Health Education Consultant, was Chief of the Bureau of Health and Physical Education.

RUSH R. RICHISON, M.D., has been appointed Health Commissioner of Springfield, Ohio. He was succeeded as Health Commissioner of Clark County by ROBERT M. TAYLOR, M.D., of North Hampton.

WILLARD J. STONE, M.D.,† of Corvallis, Ore., has been appointed Health Officer of Marion County, succeeding VERNON A. DOUGLAS, M.D.,† of Salem, who was on leave of absence for the Oregon Civilian Defense Council.

JAMES F. WILSON, M.D.,† of Washington Courthouse, Ohio, has resigned as Health Commissioner of Fayette County, a position he has held for 16 years.

Eastern States

MARY M. ATCHISON, M.D., M.P.H.,† of Concord, N. H., for some years Director of the Divisions of Maternal and Child Health and Crippled Children's Services and Acting Director of the Division of Epidemiology and Local Health Work, was recently named Acting Deputy Secretary of the New Hampshire State Board of Health. In her new position, Dr. Atchison will coöperate with local health authorities in the promotion of community health programs. MILDRED I. A. CHAMBER-

* Fellow A.P.H.A.

† Member A.P.H.A.

LIN, M.D., of Hillsboro, succeeded Dr. Atchison as Director of the Division of Maternal and Child Health and Crippled Children's Services.

CLEON W. COLBY, M.D., Health Officer of Exeter District, Exeter, N. H., has been named Acting Director of the Divisions of Epidemiology and Venereal Disease Control recently consolidated. For the present, Dr. Colby will continue in charge of the Exeter office.

BENJAMIN G. HORNING, M.D.,* Associate Field Director of the American Public Health Association since August 1, 1940, has resigned to accept the position of Field Director of the W. K. Kellogg Foundation. M. R. KINDE, M.D.,* who formerly held this position, received a new assignment as the Foundation Medical Director. Dr. Kinde is at present on leave of absence and is serving as a Major in the Medical Corps attached to the North Atlantic Division of the United States Army Engineers, New York, N. Y.

THEODORE E. HYNSON, M.D., M.P.H.,† formerly of Dover, Del., has been appointed Health Officer of Harlan County, Ky.

JACOB KATZEFF, M.D., formerly of Brooklyn, N. Y., has been appointed Health Officer of LaFourche and Assumption Parishes, Louisiana.

JOSEPH H. KINNAMAN, M.D., M.P.H.,* has resigned as Health Officer of New Rochelle, N. Y., to accept the position as Director of the Kay County Health Unit, Ponca City, Okla. Headquarters for the new Unit will be Ponca City and Blackwell. The new unit will consist, beside the Director, of an Assistant Director, HOSMER JOHNSON, M.D., 2 sanitarians, 2 clerks, an administrative

assistant, a supervisor and 6 staff public health nurses.

M. J. PLISHNER, M.P.H.,† formerly of the Tuberculosis and Health Association, Brooklyn, N. Y., now is a Captain in the Sanitary Corps, A.U.S., with a present assignment of Medical Inspector; Harbor Defenses of Chesapeake Bay and Fort Story, Va., with headquarters at the Station Hospital.

Southern States

JUANITA L. BOLTON, M.D., of Birmingham, Ala., has been appointed Health Officer of St. Clair County.

JAMES F. BRADLEY, M.D., of Liberty, Miss., has been appointed Health Officer of Noxubee County, succeeding GEORGE E. GIBBONS, M.D., of Macon.

PHILIP S. BROUGHTON,* who has recently served with the Social Security Board and formerly in connection with health education projects in the New York City Department of Health, has been appointed Director of the Division of Information, War Manpower Commission, Office of Emergency Management, Washington, D. C.

THOMAS BURK, M.D.,† of Rayville, La., has been appointed Health Officer of Copiah County, with offices in Hazlehurst, Miss., succeeding JOHN C. MCGUIRE, M.D.,† of Hazlehurst.

G. G. CAUGHMAN, PH.G., has been chosen Health Officer of Columbia, S. C.

FRANCIS H. COLE, M.D., of Nashville, Tenn., has been placed in charge of the Division of Tuberculosis Control of the Memphis and Shelby County Health Department, effective July 1. He succeeds FELIX A. HUGHES, JR., M.D., of Memphis, who has been assigned to take charge of Lynnhurst Sanatorium, Oakville.

JAMES J. CORBALIS, JR., B.C.E.,† resigned as Sanitation Officer with the Virginia State Health Department,

* Fellow A.P.H.A.

† Member A.P.H.A.

serving Fairfax County, Virginia, in the capacity of Sanitary Engineer, to accept a position with the county of Fairfax as Sanitary Engineer for the organization and administration of two sanitary districts within which water and sewerage works are now being provided by the Federal Works Agency and which constitute the Metropolitan Area of Fairfax County adjoining Arlington County and the District of Columbia with an estimated population of 40,000 people embracing an area of 31 square miles.

EUGENE H. COUNTISS, M.D., of New Orleans, La., has been named Chief of the Emergency Medical Service in Louisiana.

HUBERT D. CROW, M.D., has been appointed Director of a combined district health unit comprising the counties of Southampton, Isle of Wight, Nansemond, Va., and the city of Suffolk, with headquarters in Suffolk.

JAMES A. DOLCE, M.D.,† U. S. Public Health Service, Washington, D. C., has been appointed Health Officer of the Fairfax-Prince William-Stafford Health District, succeeding CLIFFORD E. WALLER, M.D.,* of Leesburg, Va., who remains as Health Officer of Loudoun County, with headquarters at Leesburg. Loudoun County was formerly a unit in the health district.

LLOYD M. FARNER, M.D., C.P.H.,† of Nashville, Tenn., U. S. Public Health Service, has been placed in charge of the new Industrial Hygiene Division of the Washington State Department of Health. Dr. Farner, who has been lent to the state by the Public Health Service, organized and served as Director of a similar division in Montana and later as Director of Industrial Hygiene in Tennessee.

OWEN A. GROVES, M.D., recently Health Officer for Kanawha County,

West Virginia, has been commissioned First Lieutenant in the Army Air Corps and left recently for the Army Training School at Miami Beach, Fla. No successor to Dr. Groves has been appointed.

JOHN H. HINES, M.D., of Canton, Miss., has resigned as Health Officer of Madison County, to join the Army.

HOWARD G. HOLLAND, M.D., of Leesburg, Fla., has been appointed medical consultant for the Florida Industrial Commission.

WILLIAM D. MAY, M.D.,† of Meridian, Miss., has been named Director of the Alcorn County Health Department, succeeding ROBERT H. DEJARNETTE, M.D.,† of Corinth, who has entered the Army.

MARVIN E. McRAE, M.D., of Chatham, Va., Health Officer of Pittsylvania County, succeeds SAMUEL S. SHOUSE, M.D., of Luray, Health Officer of the Page - Warren - Shenandoah Health District, who was granted a leave of absence to enter military service.

BRUCE H. POLLOCK, M.D.,* formerly the Director of County Health Work in the West Virginia State Department of Health, Charleston, is a Lieutenant Commander in the U. S. Navy and is stationed at Boston, Mass.

WILLIAM R. RICHARDS, M.D., formerly of Calhoun, Ga., has been named Health Commissioner of Green County, Greensboro, effective July 1.

J. E. ROBINS, JR., M.D., has been named City Health Commissioner of Charleston, W. Va., to succeed F. B. CARLSON, M.D., who resigned to enter the service as a Lieutenant in the Navy Medical Corps.

MARGARET M. SCANNELL, M.D., formerly of Meridian, Miss., has been named Medical Director of the Sunflower County Department of Health, succeeding ANDREW HEDMEG, M.D.,† of Indianola, who has entered the military service.

* Fellow A.P.H.A.

† Member A.P.H.A.

MARTIN H. SKAGGS, M.D., of Taylorsville, Ky., was recently elected Health Officer of Shelby County.

DANIEL C. STEELSMITH, M.D., has been named to take charge of the newly consolidated Halifax-Pittsylvania Health District (Halifax and Pittsylvania Counties), with headquarters at South Boston, Va.

RAYMOND D. TOMPKINS, M.D., of Mountain Home, Tenn., has been appointed Chief Medical Officer at the U. S. Veterans Administration Facility, Bay Pines.

EDGAR W. WARREN, M.D., of Abbeville, La., Director of the Vermilion Parish Health Unit, has been appointed to a similar position in Jefferson Parish.

GORDON R. WESTROPE, M.D., Director of the Cherokee County Health Department, Gaffney, S. C., has been appointed Director of District No. 2, including 11 upper state counties.

Western States

CHARLES BENNINGER, JR., M.D., City Health Officer of Oroville, Calif., has been appointed County Health Officer of Butte County, to succeed LOUIS C. OLKER, M.D., of Chico, who resigned.

PAUL G. BUSS, M.D., of Los Angeles, Calif., has been appointed Assistant County Health Officer of Orange County, Anaheim.

HERALD R. COX, Sc.D., Chief Bacteriologist at the Rocky Mountain Laboratory, U. S. Public Health Service, Hamilton, Mont., and President of the Montana State Public Health Association, has accepted a position as Associate Director of Research for the Lederle Laboratories, Pearl River, N. Y. He will have charge of all virus disease work.

WILLIAM P. FRANK, M.D.,† of Alhambra, Calif., has been appointed

Health Officer of the Alhambra District, including El Monte, Monterey Park, San Gabriel, San Marino, and South Pasadena.

JOHN A. KAHL, M.D., M.P.H.,† of Walla Walla, Wash., has been appointed to take charge of the newly combined tri-county health district, comprising Walla Walla, Franklin, and Benton Counties.

HAROLD L. LAWRENCE, M.D., of Seattle, Wash., Passed Assistant Surgeon of the U. S. Public Health Service, has been appointed Chief of the Division of Epidemiology and Venereal Disease Control of the Washington State Department of Health, Seattle.

ARTHUR E. LEWIS, M.D., U. S. Public Health Service Reserve, has been assigned to Seattle, Wash., as Assistant State Medical Officer for Civilian Defense.

ROSCOE C. MAIN, M.D.,* of Los Angeles, Calif., formerly Health Officer of Santa Barbara County, has been appointed in charge of the Glendale District Health Unit, succeeding JOHN M. BUCHANAN, M.D., of Glendale, who has entered Army service.

DOROTHY Z. E. McDONALD, M.D., C.P.H.,† of Madison, Wis., Advisory Physician in School Health Education of the Bureau of Maternal and Child Health of the Wisconsin State Board of Health, has resigned to become Vice-Chairman of the Department of Public Health of Loyola University Medical School, Chicago, Ill.

LESTER S. McLEAN, M.D., of San Francisco, Calif., was named Health Officer of Solano County, August 3, succeeding GEORGE O'BRIEN, M.D., of Fairfield, resigned.

CEDRIC NORTHROP, M.D.,† a member of the Washington State Department of Health, Seattle, since December, 1941, has been appointed Chief of the Division of Tuberculosis Control.

* Fellow A.P.H.A.

† Member A.P.H.A.

CHARLES EDWARD SMITH, M.D., D.P.H.,* has been promoted to a full professorship in public health and preventive medicine at Stanford University, San Francisco, Calif.

DEATHS

CHARLES RALPH ARMSTRONG, for 30 years Superintendent of the Trudeau Sanatorium, Trudeau, N. Y., died November 9, at the age of 71.

HOWARD B. METTEL, M.D.,* of St. Louis, Mo., died recently. He was Chairman of the Maternal and Child

Health Section of the American Public Health Association.

LEROY A. WILKES, M.D.,* of Trenton, N. J., died November 29, at the age of 59. He was Executive Officer of the Medical Society of New Jersey, and former Medical Director of the Austrian child health program of the Commonwealth Fund of New York. Dr. Wilkes was a Fellow of the American Public Health Association, and served as Chairman of the Child Hygiene Section 1931-1933, Vice-Chairman in 1934, and Chairman again in 1935.

* Fellow A.P.H.A.

CONFERENCES AND DATES

American Academy of Orthopaedic Surgeons. Chicago, Ill. January 17-21.

American Association of School Administrators. St. Louis, Mo. February 26-March 2.

American Society of Civil Engineers—Winter Meeting. New York, N. Y. January 19-22.

Annual Forum on Allergy. Cleveland, Ohio. January 9-10.

American Water Works Association—

Canadian Section—Royal Connaught Hotel, Hamilton, Ontario, Can. April 7-9.

Pacific Northwest Section—Bellingham, Wash. May 7-8.

Conference on War Winning Water Works Operations—June 14-17. Carter and

Statler Hotels (co-headquarters), Cleveland, Ohio.

Clinical Orthopaedic Society. Chicago, Ill. January 18-21.

Fifth Annual Congress on Industrial Health—sponsored by the Council on Industrial Health of the American Medical Association. Palmer House, Chicago, Ill. January 11-13.

National Conference of Social Work. Cleveland, Ohio. May 23-29.

Rocky Mountain Medical Conference. Biennial Conference. Albuquerque, N. M. May 18-20.

Social Hygiene Day—American Social Hygiene Association. February 3.

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The Present Epidemiological Basis of Environmental Sanitation*

GAYLORD W. ANDERSON, M.D., DR.P.H., F.A.P.H.A.†

Professor and Head of the Department of Preventive Medicine and Public Health, University of Minnesota, Minneapolis, Minn.

ENVIRONMENTAL sanitation is the oldest form of public health endeavor. To it can be attributed the reduction in cholera and typhoid fever, much of the reduction in summer diarrheas, control of many of the milk- and food-borne infections, elimination of yellow fever from certain areas, progress in malaria control, forward steps in elimination of industrial hazards—in short, some of the outstanding accomplishments of public health workers.

That sanitation should be the foundation upon which the modern superstructure of public health has been erected was the inevitable result of the evolution of concepts of infectious disease. As our predecessors conceived these to be due to inhalation of toxic emanations from decaying filth, early public health attention was logically directed at cleanliness of the environ-

ment. The advent of the era of bacteriology made possible the separation of the program into two components, the one with a specific disease prevention value, the other with mere esthetic value. It was thus possible to concentrate on those aspects that had health significance, rather than dissipate energies in attempts to attain mere cleanliness.

Although this concentration was desirable, it had, nonetheless, an unfortunate consequence for it led to a tendency to reject all measures that could not be shown to have specific value in disease prevention. "Clean dirt" was distinguished from "dirty dirt," and municipal sanitation was divorced from public health engineering. The sanitation program was reduced to what was often called "its bare essentials," and a notable local health demonstration was even begun without provision for sanitation.

Although I am in hearty accord with attempts to eliminate useless procedures, such as some of our ridiculous and almost barbaric quarantine requirements,

* Presented at a Joint Session of the Engineering and Health Officers Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

† Now Major, Medical Corps, Army of the United States

I nonetheless submit that complete disregard of the esthetic aspects of environmental sanitation is not only illogical but even detrimental to public health progress. Many of these esthetic components have contributed immeasurably to our standard of living. The cleanliness of a community's streets, parks, food handling establishments and public buildings, including the public toilets, is a true measure of its standard of living. If we neglect these, we sink into a neglect of measures of greater importance. The standard of living is a vital factor in community health, important in the decline of many diseases, notably tuberculosis and infant diarrheas. I do not wish to belabor the point, nor have I time to be more specific. I do, however, wish to emphasize that in attempting to place environmental sanitation on a sound epidemiological basis we must not so completely lose sight of the intangible esthetic aspects that what we today consider progress through elimination of nonessentials is revealed tomorrow as a backward step.

Without losing sight of these esthetic elements, let us examine some of the present epidemiological bases for environmental sanitation. Since the recent issues of our JOURNAL suggest that there may be many shades of meaning applied to the term "epidemiological," I must define the limits of the term for this discussion. I conceive of epidemiology as the science of the occurrence of disease. It embraces consideration of all factors bearing on the development and prevalence of any disease condition. We must, therefore, examine the extent to which disease in the individual or the community may be influenced by the environment. Entire volumes have been written on only small parts of this broad topic. Here I may direct attention to only a few salient points.

Improvement in water supplies needs

no justification. There is ample evidence of the relationship between specific contamination and intestinal infection. It may not be out of place, however, to point out the danger that our past triumphs may engender a smug complacency that will be periodically shaken by the recurrence of disease. We are constantly being treated to the unpleasant spectacle of a public using with apparent impunity water that does not conform to accepted standards. There is danger that some of us may conclude that the standards are unnecessarily strict and not justified by current epidemiological experience.

To do so would be to display a fundamental lack of insight into the basis of these standards. Based on extensive experience showing that water with a certain degree of pollution cannot be drunk without risk of contracting typhoid fever, they presuppose a numerical relationship between the number of typhoid and colon bacilli in the sewage of a community. That this ratio is not the same for all communities or for long periods of time in the same community is well known to the epidemiologist. The community that has had much typhoid fever in the past 20-30 years has a higher ratio of typhoid to colon bacilli than has the community with a low typhoid record. It is not surprising, therefore, that the latter may use with impunity a water with a colon index that would be positively dangerous for the former. This does not mean that the standard is wrong but rather that the community is flirting with danger of future trouble if it disregards the obvious implications of the standard. The possible appearance of dysenteric infections if the standard be disregarded is also a threat that cannot be ignored. If we attach the least degree of esthetic significance to the drinking of water containing the living excreta of another man's bowel, the standard is also good.

The possible rôle of water in the development of other diseases is important to the engineer and epidemiologist alike. Discovery of the virus of poliomyelitis in the excreta of patients and carriers, and in the sewage of a community in which the disease is prevalent, naturally raises the suggestion that the disease is water-borne, and that added attention may have to be given to purification of water and disposal of sewage.

It should be pointed out, however, that the mere presence of micro-organisms in feces does not mean that the normal mode of spread is via water to which sewage finds access. The organisms of tuberculosis and pneumonia may be found in feces and yet there is no evidence that either disease is spread by water that we drink or in which we swim.

Before we can assume the spread of poliomyelitis through water, we must show the occurrence of the disease to be consistent with such a hypothesis. It is to be regretted that too little attention has been paid to the wave-like character of spread, a phenomenon pointed out so clearly by the late Dr. Wade H. Frost as long ago as 1916. One cannot accept the concept of spread through water when he sees the disease spreading (like measles) as ripples spread from a stone dropped in a quiet millpond, the peak of incidence in contiguous geographical areas of a single city showing a regular progression from a focus—all this in an area with a single water supply. Personally I am aware of no outbreak of poliomyelitis in which the epidemiological evidence even suggests water as a vector to the exclusion of other channels of infection; on the other hand, I am familiar with innumerable outbreaks in which the water-borne hypothesis is absolutely untenable.

If on epidemiological grounds I would exclude poliomyelitis from the possible

sphere of sanitary control, by the same token I would direct your attention to the possible rôle of environmental regulation as an element in the fight on dental caries. Although caries is obviously the result of the interplay of many forces, the metabolism of fluorine seems established as a factor of importance. The work of numerous investigators indicates a higher incidence of caries in a community drinking a fluorine-free or deficient water than in one using a water that will induce a low degree of fluorosis. Brekhuis and Armstrong have found the fluorine content of the carious tooth lower than that of the non-carious. Only a few years ago fluorine was enthusiastically removed from water to prevent mottling of the teeth. Today we must consider the possibility of adjusting the content to a level that may inhibit development of caries and yet not induce fluorosis. Although much remains to be learned before the method is practical, I feel confident that the day is coming when fluorine may be added to some waters and subtracted from others with resultant benefit to dental health.

In the realm of milk sanitation, modern epidemiological concepts also support the basic tenets upon which our program is based. Unfortunately, however, much of our milk sanitation antedates careful studies of the "sources and modes of infection." It is not surprising, therefore, that many milk codes should contain items that are not easily justified. They may be defended on the ground that they conduce to a low bacterial count, yet the emphasis that is placed on nonessentials is too often at the expense of items of far greater importance. I refer to some of our haggling over barn design or location of manure piles to the disregard in many communities of an obvious need for pasteurization.

In a recent issue of *Harpers* a former Department of Agriculture employee

charges that some of the high price of milk is due to unnecessary sanitation: "For more than eighteen years the U. S. Public Health Service has been urging the universal adoption of uniform, sensible milk standards, but less than one-third of the nation's milk areas have thus far fallen in line." Had the author been less concerned with accusation, he would have had to add that a substantial part of the recalcitrant two-thirds has standards so far below those of the U. S. Public Health Service Standard Milk Ordinance that, in the words of one of our late associates "anything can be sold as milk that is white, pours and comes from a cow." To present the complete picture he would have also had to add that in at least one state the agricultural interests, in spite of health department opposition, forced adoption of grading legislation that precluded adoption of the standard milk ordinance. It is unfortunate that popular magazines should peddle half-truths to a gullible public.

Yet in the writer's charges there is nonetheless some element of justice. Overlapping inspection and too zealous exercise of local prerogatives often result in needless expense to the farmer without sanitary justification. It behooves us to appraise our milk regulations from time to time, not solely to make them more stringent but to determine if they rest on a firm epidemiological basis. I feel confident that most of them will stand the searching light of scrutiny but there are some that I know will not. Merely as examples of the latter I would cite regulations as to collection of milk bottles from homes with communicable disease and the sale of milk from farms where infection exists.

I recall visiting a home in which four cases of meningococcus infection had occurred over a period of as many months. As the house had been under

constant quarantine, the milk bottles had so accumulated that they covered a large front porch except for a narrow path to the door. It was through this path that I walked with my portable incubator to carry throat cultures to the laboratory. I had to transport them in the incubator lest the organisms die in the March cold; yet apparently the board of health considered that they might live for weeks or months on dry milk bottles which were being accumulated for a final orgy of disinfection. If the usual cleansing methods are inadequate to treat bottles from the home where frank cases exist they are equally inadequate for those from homes harboring the more numerous carriers and missed cases. Either the measures are shockingly inadequate or these special precautions are unreasonable.

Somewhat similar considerations apply to measures of dealing with milk from infected farms. All too commonly this is excluded from even the pasteurization plant. I do not for a moment question the importance of excluding this milk from sale if it is to be distributed raw. In the case of a pasteurized supply the case seems to me to be different. I recently found considerable horror expressed over the practice of one state of permitting creameries to accept milk from farms where typhoid fever carriers reside. Yet I submit that if the process of pasteurization is inadequate to kill typhoid organisms where they are known to exist and suitable precautions taken to guard against their introduction into the milk, the same process is equally inadequate to destroy those that enter from unrecognized carriers. Epidemiological experience shows the process to be adequate. Nor do I know of any evidence that this more lenient point of view has resulted in disease—unless perhaps a phobia on the part of its critics.

In the field of food sanitation we also find practices that do not rest on sound epidemiological basis. At the risk of possible misinterpretation I must emphasize what should by now be a truism, that mere spoilage of food does not render it unfit for human consumption. The fondness of the sportsman for high game and of the epicure for certain cheeses belies the old presumption that protein decomposition products are poisonous. Personally I do not like my protein decomposed—beyond a certain point—and therefore welcome a food inspection that protects from the unscrupulous merchant who would attempt to defraud. We must, however, recognize this as fraud prevention, not as disease prevention. As fraud prevention it needs no apology; masquerading as disease prevention it stretches intellectual honesty to the breaking point.

I wish I could cite evidence that lack of decent cleanliness in the handling of dishes in food handling establishments is likely to result in demonstrable disease, for I should welcome a basis for enforcing better dishwashing in the restaurant and soda fountain. And yet I know of no convincing evidence of this character. This does not mean that we should relax in our efforts to achieve decent standards of cleanliness—standards that satisfy our better esthetic senses, bespeak a high standard of community cleanliness, and assure destruction of the pathogens likely to be spread through the mouth. It is better to seek these standards than to dissipate our efforts in attempting to achieve bacteriological sterility with complicated devices of more value to the manufacturer than to the public. In our hospitals we are even more illogical in that we often insist that dishes of the infectious patient be boiled for ten minutes. Can it be that when we increase the temperature from the 160° F. that is effective in the

short-time, high-temperature pasteurization to the 212° F. of boiling we must increase the time from 20 seconds to 10 minutes? Or can it be that measures adequate for the dishes soiled by the unrecognized carrier are inadequate for those used by the recognized case?

The problem of waste disposal, and particularly contamination of bathing places, offers another situation in which we must fall back upon esthetics for support of current practices. I am not condoning dirty, filthy, or polluted swimming pools or beaches. We have a right to demand that the water in which we bathe is not mere diluted sewage. Common decency dictates cleanliness and needs no apology. Yet in setting up these standards we must not delude ourselves into believing that we will materially affect the incidence of communicable disease. I have heard many accusations as to the spread of disease through swimming, yet for none of these can I find evidence that is even presumptive. Respiratory diseases have been spread at beaches and pools, yet I see no evidence that this has been through water rather than direct respiratory exchange. Skin infections may well be spread through exchange of towels and bathing suits and conceivably by lying on a moist sandy spot recently vacated by a sufferer from such infection. I would not deny this possibility or even probability, but no one has suggested disinfection of the sand though many have urged disinfection of the water to prevent spread of impetigo. Some have even suggested that venereal diseases might be spread through the waters of bathing beaches. I would not deny that these diseases have been spread at the beaches but I insist that it is not through the medium of water. Sanitation of swimming pools and beaches is a matter of such obvious common decency that it needs no support from far-fetched

epidemiology. Unfortunately epidemiological experience cannot even assist in the determination of reasonable standards.

Industrial hygiene has probably made more progress than any other branch of environmental sanitation in its attempt to base control practices on a sound epidemiological foundation. Tolerances for specific chemicals have served as the basis for standards of concentrations to be permitted in the working environment. The fact that a dust-free or fume-free atmosphere was neither attainable nor essential has been faced realistically and control efforts directed at reducing concentrations below the critical levels determined by experience.

This is a refreshing contrast to the attitude too often displayed in certain other phases of public health control. The attitude to which I refer is that of sitting with the feet before the fire, some mental stimulant at the elbow, and thinking up regulations to control every conceivable hazard to which man may be exposed. Of course, it will be objected that the chance acquisition of a small dose of bacteria is of vastly more significance than of chemicals because of the former's capacity for reproduction. Yet as already pointed out the mere demonstration of the presence of bacteria in the environment does not imply epidemiological significance. Due consideration must be given to the problem of dosage and the capacity to infect when introduced by various portals of entry. We could profitably emulate our brothers in industrial hygiene and attempt to put some of our other control measures on a sound basis of experience rather than on mere theory.

Of the many newer aspects of environmental sanitation, the standards of housing seem to rest on especially insecure epidemiological foundation. I would not question the potential health

significance of housing, and yet epidemiological data on which to base this belief are virtually nonexistent for poor housing cannot be separated from other attributes of poverty.

This inability to secure epidemiological support for housing standards should not discourage us from attempts to improve housing conditions or even to do so by regulation. Almost every community has houses that by no stretch of the imagination can be defended as desirable for human habitation. An appreciable fraction of our population lives under conditions that are undesirable socially, morally, and hygienically. Housing needs no defense nor need it await epidemiological support. It is important, however, that in our eagerness to effect improvements through use of regulatory power, we do not deceive ourselves as to the limitations of our knowledge. We must keep an open mind and be prepared to modify our standards in the light of future research; not attempt to defend the unreasonable on the basis solely that it is hallowed by tradition.

In presenting this brief discussion of the present epidemiological basis of environmental sanitation, I have purposely sought to avoid philosophical discussion of general principles. Rather have I sought to cite a few examples, chosen at random from varying fields, to illustrate the extent to which current practice may or may not rest on a sound epidemiological foundation. From your own experience you can each add countless examples. You can draw from fields that I have not attempted to touch, such as insect control. You can generalize far more than I have attempted to do. You will find, as I have already suggested, that on the one hand we have sought to base standards on epidemiological evidence that does not exist and on the other hand have ignored well established evidence. In short, we have been supremely human.

In acknowledging the lack of epidemiological support for many of our sanitary practices, I trust that I shall not be branded as an iconoclast, as I was so labelled in jest by one of your members a year ago. It would be Utopian if we could find sound basis for all measures of sanitation, but at present we cannot and I doubt if we ever shall. This lack need not deter us, however, from attempts to improve the sanitary standard of the community.

Cleanliness is still next to Godliness and will always remain so. It needs no apology. It is essential, however, that we maintain a clear perspective if we are to preserve our intellectual honesty. This perspective requires periodic re-evaluation of our practices, elimination of the illogical and unnecessary without undue sacrifice of those esthetic components that conduce to that intangible yet highly valuable asset that we refer to as the standard of living.

Science and Government

A PRESIDENT may use the findings of scientific agencies in a truly scientific way—for the purpose of developing the soundest possible national policies. Or he may use these resources for the purpose of support for policies which have been predetermined by political considerations. As the primary seat of power, the President is in a position to exert pressure throughout the administrative personnel of the government. The scientific personnel in government departments may assemble the data required with true

scientific objectivity; but they are usually debarred from interpreting the meaning of the data or formulating conclusions to be drawn therefrom. This, as previously indicated, is the function of the bureau chief who is nearly always a part of the political hierarchy. In short, scientific men can be scientific up to a point; and the point beyond which they cannot go is usually the vitally important point. Quotation from article by Dr. Harold G. Moulton, "Science and Government," in *Science*, Dec. 11, 1942.

A Physician Looks at School Dental Programs*

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MY purpose in this paper is to look back several years at our experience with developing an economical dental program in the Astoria School Health Study. In these days of civilian economy and rationing, procedures which bring results without increasing costs are, I believe, worth review. The full description of the dental program upon which my remarks are based is given in the published report of the Astoria Study titled "Solving School Health Problems,"¹ and also in several papers by Lifson.²

I make no claim that this program is unique. It is similar to one Turner³ has successfully conducted in Malden for many years. I am encouraged to discuss it because now it may have more significance, since it has the virtue of being economical. I have not tried, even if it were possible, to evaluate this program by any of the criteria recently suggested by Knutson⁴ in his constructive paper in the *Public Health Reports*, nor can the results be accurately measured as Kramer⁵ has been able to do for his state-wide activities in Kansas. Most of the data are limited to one year's experience. They are based for the most part on examination and treatment by private dentists who, as you all

understand, vary in their standards of work.

Nevertheless, I believe the experience deserves reviewing because it faced some very fundamental questions. They are questions which every public health dentist and school health administrator ponders: How can I develop an effective program without increasing the budget? How can I utilize the dentists of the community in the school dental program? How can I make the most effective use of a dental hygienist? What responsibility can the elementary school classroom teacher assume in dental follow-up? Is the school the place for the dental examination? From this experience, we found that the private dentist can and should have a more intimate working relationship with the school dental program; that elementary school classroom teachers were not as effective in securing dental attention for children in the primary grades as in the upper grades; that the dental examination does not belong in the school but in a dentist's office; that this program can operate without additional funds, when more effective use of existing school and community resources is made.

A DESCRIPTION OF THE PLAN

The operation of this dental program involves principally the teacher and the community dentists, with the school nurse playing a secondary rôle. The teacher has three responsibilities: (1)

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To inform all parents once each year that the child needs a dental examination; (2) To conduct systematic contacts with the home until the child receives attention; (3) To record on each child's *Pupil Health Card* the progress he has made during the school term in obtaining treatment.

The private dentists agree to give a dental examination to any child coming to their offices accompanied by a parent. The nurse's responsibility is to make a limited number of appointments in the school dental clinics and other available clinics for those children obviously clinic cases or who are recommended for clinic care by private dentists. It will be shown below that the plan would have been more effective if, for the primary grades, our procedures included a personal interview by the teacher or school nurse with the parents of those primary graders who do not respond to the teacher's letter urging a dental examination.

Four steps were necessary to initiate the program. Fortunately, at this time the two dental members of the District Health Officer's Medical Advisory Committee were the presidents of the two dental societies in the community. First, the program was explained by the District Health Officer to these two dentists. Second, these dentists called a meeting of all dentists serving the Astoria-Long Island City Health District and discussed it in open meeting. Third, after the coöperation of the community dentists was assured, the plan was proposed first to the district superintendent of schools and then to the eight school principals concerned. Fourth, a letter to be sent to each parent was formulated by the Study Staff and submitted to representatives of the dental profession and school authorities for approval. This letter carried the signature of the principal of the school attended by the child.

RESULTS

What were the results? At the end of the school year, 1937-1938, for which we have complete data, 88 per cent of the children in the eight schools participating in the demonstration had been examined by dentists. Private dentists examined two-thirds of the school registrations; supplied almost three-quarters of the treatment services; and were responsible for 82 per cent of the cases completing treatment. Treatment was found unnecessary for 21 per cent of the children examined. Parents of 1,859 of the children took no action. This is 29 per cent of all the children in the group. This figure includes 17 per cent found by a dental examination to need treatment but who did nothing about it, and 12 per cent who never availed themselves of the examination. An inquiry was made as to why parents did not take their children for dental examination or secure necessary treatment. About one-half the responses were classified as indicating lack of understanding or unwillingness to coöperate. The other large group were those whose excuse was economic need.

THE RÔLES OF THE TEACHER AND DENTAL HYGIENIST

When the results were analyzed by grades, we discovered that the lower the grade, the less dental care the children received. For example, 44 per cent of the children in the kindergarten never reached the dentist even to be examined. On the other hand, above the 4th grade 90 per cent or more in each grade visited a dentist. Thus, in the age group for whom protective dentistry is most important, the teachers' efforts were least successful. While these poor results may be explained by lack of appreciation by the teachers of the importance of early care of baby teeth and 6 year molars, it is likely that the parent influences the situation more in this younger group than in older chil-

dren. If parents do not believe that care of baby teeth is important, the primary school child is not likely to be taken to the dentist, regardless of the notes he may bring home from the school recommending a visit to the dentist.

This assumption is strengthened by two other studies made in Astoria in which the dental hygienist's efforts were compared with those of the teacher. A dental hygienist worked with 238 children in the 7th grade. Her procedure was to send a note to the parent and, if no visit was made to the dentist, to have one or two conferences with the child. Of all the children who received care by this plan, 90 per cent obtained it within 6 weeks after the dental hygienist's first note sent to the parent. Completed care was obtained for about 30 per cent of the children. Nearly 30 per cent of the children received no dental care in spite of the repeated efforts of the dental hygienist. On the other hand, we have already observed that teachers were much more successful with this upper grade group. A study made by Frankel,⁶ using four schools in Astoria, supports the theory that the parent is the important factor in securing dental care for primary graders. Using schools which children of relatively the same economic status attended and using 1st, 3rd, and 4th grades, the children were examined by a dentist who determined the condition of their teeth at the beginning of the experiment and reexamined them at the end of the 7 month period of the study. In three of the schools the teachers did the same follow-up work as has just been outlined. In the fourth school, a dental hygienist was used to interview the parents of those children who did nothing after the first note was sent home. It was found that, in terms of dental correction secured, the children where the dental hygienist worked with parents had received almost three times more

dental care at the end of the 7 month period than the children in the schools where notes alone were employed.

I do not believe this conference method depends for its success entirely upon a dental hygienist. Any school health worker such as school nurse, physician, or teacher, who can meet the parent and discuss intelligently the value of dental care and demonstrate to the parent any obvious caries that need attention probably will be equally effective with this younger group. The result obtained by the teachers in the upper grades is, for practical purposes, quite satisfactory and indicates that for this age group the individual conference method is not essential to secure dental care for most of the children. This difference in the method of follow-up which must be employed, depending upon the age group of the children, is worth noting because today in the interests of economy and more effective use of limited professional personnel in the school program we need to know more than ever before where professional services must be applied to bring the greatest return.

SHOULD THE DENTAL EXAMINATION BE MADE IN THE SCHOOL?

The purpose of a school dental examination is to detect dental defects early so that prompt correction is possible. Yet reports indicate that dental caries is present in 80 to 90 per cent of all children.⁷ It hardly seems like economical public health practice to spend time, which is money, in the examination of hundreds of children in order to single out the small group of children with sound teeth, and these teeth might not be free from caries if x-rays were taken. If this examination were to be made in a dentist's office, which is the usual place for treatment, it would be of greater educational value. The school's job regarding dental health is to educate every child in proper dental practices.

Is the school fulfilling this function effectively when it teaches children to depend upon the school for dental service, knowing that this paternalism will end at graduation? It would appear to be better policy for youth to learn while it is still in school the path to treatment facilities in the community. Youth should also learn that dental fillings are worth paying for.

In defense of the dental examination in the school it is admitted that it may identify the serious cases which need attention sooner than others. It is said that these are the very cases which are most likely to ignore the advice of the school if all it does is urge a visit to the dentist to be examined. Again it probably comes down to a question of what is available in the budget and what policy is likely to result in the greatest good for the greatest number.

THE PRIVATE DENTIST'S PART

As soon as one thinks of the private dentist being brought into more active participation in the school dental program, he thinks of all the reasons for excluding him. These are the same objections which many school medical administrators voice regarding the participation of the private physician. Prominent among the reasons are: (1) The great variation among private physicians in examining technic; and (2) lack of interest in children's health problems; (3) poor coöperation with the school; (4) inadequate record keeping. These are not insurmountable. Morris⁸ has answered these objections in his work with organized dentists in Michigan. We saw the solution as soon as we brought the Astoria dentists together to discuss the program.

It was during the first open meeting, I remember, when the dentists discovered and discussed their differences in examining technics. The dentists who used bite wing x-rays strongly urged that procedure be used by all. There

were many dentists who believed that the explorer was adequate. This is a technical problem which the Study considered had to be solved by the dentists. But it illustrates the opportunity for "painless" professional self education which a plan of this type offers. Along this same line were problems of standardization of the examination with respect to reporting of defects and the keeping of uniform records. There were some dentists, after a few months' operation of the program, who felt that the examining job should be carried out by a select few from the dental society members and that the examinations might be made in school. Before the program had been under way very long, some of the dentists complained of overcrowding their offices; others, who were located in the poorer sections of the district, got very few pay patients out of the examination program. There were, at the end of the year, many who reported that they had received many new patients through this program. Another interesting observation was that the private dentist completed treatment much more promptly than the clinic dentist. Actually, of all the children who completed treatment during the year, 82 per cent were finished by private dentists.

These developments are symptoms and signs of the learning process. Our plan had deficiencies, but the most important thing, to my mind, is that we succeeded in getting the dentists interested and participating. The slow process, the mistakes, the bickerings, all are healthy and necessary stages in the education of any body of private practitioners entering upon a group project.

In school health work the private practitioner can, in most communities, participate in the program more than he does. Even in communities where school dental clinics are highly organized, service is rendered to only a fraction of the children. And the need for service is

very great. McCall finds that many children have one or more decayed teeth at 2 or 3 years of age. Klein and Palmer show that the permanent teeth of children under 14 years of age are decaying as fast or faster than they are being filled.⁷ Eight out of ten N.Y.A. youths were found to have untreated dental caries.⁹ While some proportion of these children are in families who cannot pay anything for dental care, the per cent is not as large as some would have us think. Many children included in the data just cited are in families who can afford dental care, while in their community are dentists who are not busy. I think the basic problem is one of maldistribution. On this point Sandler¹⁰ says, "Only a small percentage of the children who can afford dental service actually receive it and there are few dentists who do not waste many precious hours waiting for patients." East¹¹ has found that non-relief families spend about \$9 a year for dental care, although they spend \$24 for tobacco. More than half the families of the United States, not including those on relief, spend nothing for dental care. Certainly with the national income breaking all records in most communities today there should be but few families who cannot afford expenditures for protective dental care if they believe in it.

From our experience not only in Astoria with school children, but in the Metropolitan Life Insurance Company with 15,000 clerical workers in the New York Home Office, much can be done to increase dental service by educational means. The Dental Division of the company reports that company employees receive almost twice as much dental care as the people in the highest income, studied a few years ago by the Committee on the Cost of Medical Care.¹² Dr. Dunning, Director of the Dental Division, says that this is due not to any higher cavity rate among

Metropolitan employees but is genuine evidence that individuals can and will afford a larger proportion of dental service under stimulation than they would be likely to think they could afford without such stimulation. Morris¹³ says that the relationship between the economic status and the willingness of the family to pay for the treatment is not as close as we generally believe. He says the Kellogg experience in Michigan has demonstrated that it is first necessary to educate the family as to the value of dental service, and at the same time to educate them that it is a service they should pay for. He adds also that they have not observed any tendency for families to relinquish the responsibility for payment as the child gets older. He goes on to say that last year economic conditions in the areas where the Kellogg program functions have been a great deal better than they have at any time since the program was initiated. The reports this year, he says, will show a tremendous increase in the number of private patients.

We shall achieve the goal of protective dentistry and preventive medicine when the individual practitioner understands these objectives. The protective dentistry and preventive medicine of a community is only as good as the work of the private practitioners in the community. We, public health physicians and dentists, must bear in mind that the private practitioner is the man who must apply our theory to the individual. Our ideals of early protection and correction of defects and regular health supervision are so many words unless the individual practitioner who sees the public, too late many times, both in dentistry and in medicine, understands these concepts. The best way for him to understand is through active participation in programs which are based on these ideas.

To interest the professional man in the health program, he first must be-

come aware of the significance of the problem in his own community, and then be willing to spend time and effort to analyze the problem and participate in trying to solve it. Those of us in public health have a responsibility to encourage our colleagues in private practice to participate in community activities. The average practitioner of medicine and of dentistry has not been taught as a part of his professional training how to join hands for a common objective. The nature of his work and of his income makes him an individualist. This is particularly true of the dentist. He is too occupied, and necessarily so, to take the initiative in such community projects. This deprives him of experience which he should acquire in order both to adjust to new circumstances, and to have a hand in shaping his own destiny as well as that of his profession. The approach to the dentist or physician is through his society. The better organized the society, the more likely is the prospect of developing interest and action.

I think public health dentists have made notable progress in this respect. For example, in the seven counties in Michigan where the Kellogg Foundation, under the direction of a dentist, has been financing community health service through county health departments, dental and medical service for school children is conducted entirely by the local practitioners.¹⁴ While this is probably slower as a method of securing a uniform high quality of work from the participants, nevertheless it seems to me far superior as a long-range objective than the introduction of clinic services which compete with the private practitioner and aggravate this problem of distribution and delay the day when all private practitioners will practise prevention as well as cure.

The dentists in Astoria are no different from professional men anywhere in this country. Many were suspicious of

the plan, seeing it "State dentistry." Some saw the variation in the quality of examination and treatment which would be given by different dentists. Others thought the Health Department should pay the private dentists for the service, and other proposals were made at the meetings when we discussed the plan with the community dentists. The fact that 17 per cent of the children who were examined did not return for treatment can be laid at the door of the examining dentist. But these are not irreparable faults: they are a challenge to our leadership. Morris,⁸ directing the Kellogg Foundation activities with private dentists in Michigan has used these as teaching opportunities. The dentists through their own organization can correct these deficiencies.

No claim of perfection is advanced to describe this Astoria program. It did place many children under dental care; it gave the teachers a concrete objective in their health teaching; it indicated that, in order to secure dental care for the younger age groups, individual conferences with parents are more necessary than with older children. It tended to distribute more efficiently the limited clinic services available in the district; it permitted a large number of practising dentists to participate for the first time in a public health effort, and most of them increased their clientele.

It is possible that in the future other solutions of this problem will come through the development of insurance schemes. Several have been suggested, but none, to my knowledge, are in actual operation. One of the factors which seems to operate against the development of dental insurance is that dental needs are too predictable on the part of the individual policy holder. There is practically no expectation of a cataclysm in the dental field such as medical patients might be willing to anticipate by the payment of premiums throughout long periods of good health.

Except perhaps in those communities where war industry has overwhelmed all available dental facilities, we cannot think today of expanding clinic facilities. We must aim toward using the already available dental man power and equipment 100 per cent of the time. The first step in that direction is to bring the private dentist into more active participation. We must avoid any duplicating or competing effort. By virtue of its educational functions and the population group it serves, the school health program exerts a strong influence on the entire health program. Wise leadership will promote the use of already existing facilities for protection and preventive health services. If services must be supplied by the school, it should not become a competitor of the community dentist, but supplement gaps he cannot fill. Too readily administrators accept the idea of a deficiency without being resourceful. As in many commodities today, a real shortage may not exist but be based on faulty distribution. Officials whose job it is to break these bottlenecks and improve this distribution problem are called "expeditors." We need more "expeditors" in our public health program.

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Salmonella Typing in a Public Health Laboratory*

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THE salmonelloses of human origin have long been a subject of study and an object toward which control measures have been directed by public health workers. It is one of the outstanding triumphs of the public health profession that widespread epidemics of typhoid and paratyphoid fevers (the salmonelloses of human origin) are, in general, things of the past. The sporadic case and the undiscovered carrier still persist and are considered important enough for painstaking epidemiological investigation.

A somewhat different attitude exists toward those *Salmonella* infections of man which are of animal origin. As a general rule, those infections attract notice only when a group of people are made ill with an acute infective process following the eating of a common meal or common food. In such outbreaks, generally termed food poisoning or acute gastroenteritis, the causative agent is frequently isolated but the epidemiological investigation seldom elicits adequate proof of the chain of events leading to the specific contamination of the food.

Generally speaking, even less infor-

mation is forthcoming from investigation of the sporadic case of infection with a *Salmonella* of animal origin. Yet these infections are very common and are sometimes severe and of long duration, ranging from the subclinical case to a true typhoidal syndrome. In infants and young children the illnesses produced may be violent and fatal with invasion of any tissue or organ.

Much of the failure to arrive at epidemiological conclusions on which to base control measures may be traced to slow and inadequate laboratory work. This in turn often stems from a commendable caution on the part of the laboratory worker in passing a final opinion on the nature of an organism which cannot be identified rapidly and exactly with materials available commercially. Perhaps more frequently the cause is the tendency of many laboratories to arrive at a diagnosis of "Paratyphoid B" too readily or to class all *Salmonella* cultures except typhoid strains in some pseudo-generic category such as "paratyphoid-enteritidis group." The former designation, when incorrect, results in confusion since it may place emphasis upon the wrong epidemiological approach, and the latter gives too little information for satisfactory follow-up work since the group is ubiquitous in the animal world and,

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when applied in so loose a manner, may erroneously include "paracolon" and other organisms of doubtful significance.

Serological classification of the *Salmonella* group is the only logical and complete manner in which a laboratory can meet the problems involved and give true direction to the epidemiologist and to the administrator. Not every laboratory, probably very few, can furnish this service in detail, but many can and should be equipped to do enough serology to identify the main somatic groups of the *Salmonella* genus and to distinguish between the few types of human origin and the many of animal origin. In the United States, this involves as a minimum the serologic recognition of 4 somatic groups, the identification of the typhoid organism and the separation of the true paratyphoid B organism, *Salmonella schottmuelleri*, from the frequently encountered strains of animal origin, principally *Salmonella typhimurium* and certain members of the *Salmonella choleraesuis* group. Even this minimum service will give basic information of real value about 99 per cent of the cultures isolated.

A similar situation was satisfactorily met by public health laboratories when serum therapy was the only accepted specific treatment for the pneumonias. It is now generally recognized that our pneumococcus typing methods were inadequate since we were aware of only 30 pneumococcus types when at least 50 are now recognized (Kauffmann, Mørch and Schmith¹). Certainly if the effort of maintaining about 40 carefully standardized diagnostic sera for that work was practical, it is just as practical to maintain the smaller number of sera needed for recognizing the main somatic groups of the *Salmonellae* and for identifying completely the more common types of importance in human medicine.

The following description briefly summarizes the methods used in Connecti-

cut and the results obtained. The authors have had the benefit of advice freely given by Dr. P. R. Edwards of the National Salmonella Center, Lexington, Ky., who is mainly responsible for the manner in which our serological routine has been evolved, who has furnished us with authentic cultures of the various types and who has typed those strains which we have been unable to identify completely.

IDENTIFICATION OF SALMONELLA GROUP BY CULTURAL AND PHYSIOLOGICAL CHARACTERISTICS

Satisfactory isolations are made from fecal specimens collected in 30 per cent glycerol—0.6 per cent salt solution which is also suitable for the dysentery group. Fecal suspensions are plated on bismuth-sulfite, SS and MacConkey agars both directly and after enrichment in Selenite F. Preliminary identification of *Salmonella*-like colonies is made on the basis of reactions in Kligler iron agar modified by the addition of 0.1 per cent sucrose. After replating for purity the usual tests are made: Gram stain; motility; Voges-Proskauer, indole and hydrogen sulfide tests; fermentation of glucose, lactose, sucrose, and salicin and of other carbohydrates as necessary; and fermentation of dextro-rotatory tartrates.

Positive indole or Voges-Proskauer tests or fermentation of lactose or sucrose exclude the organism from the *Salmonella* group and in general the same is true of salicin fermentation. For exclusion of a true diphasic paratyphoid B strain, utilization of tartrates is a criterion which is seldom wrong and which gives an indication of the probable animal origin of the culture. Serological identification can be made immediately after the purity of the culture is assured and after the organism has been tentatively placed in the *Salmonella* group by means of the tests described above.

ANTIGENIC ANALYSIS

Method for the Diagnostic Test—

The methods for serologic typing are essentially those of Kauffmann.² For the somatic grouping, an alcoholized antigen is used in a slide test. Flagellar reactions are determined with a formalinized broth culture in a tube test after incubation at 50°–55° C. In all cases satisfactory results depend upon proper standardization, and adsorption if necessary, of the typing sera.

Somatic antigens are prepared by emulsifying the growth from an 18–24 hr. agar slant in 1 ml. of absolute ethyl alcohol. The suspension is heated at 60° C. for 1 hr. to inactivate the flagellar components, centrifuged and drained. The sediment is then suspended in about 0.5 ml. of 0.85 per cent salt solution. The test is made by mixing a drop of antigen with a drop of the typing fluid on a glass slide and tilting back and forth for 1–2 minutes. Agglutination is then read macroscopically.

Flagellar antigen is made by adding to an 18–24 hour, actively motile broth culture an equal volume of saline containing 0.6 per cent formalin. For the test, 1 ml. of antigen is added to a tube containing 0.01 ml. of the standardized serum and the mixture is incubated at 50–55° C. Tubes are observed for floccular agglutination at the end of 1 hr. and again after 2 hrs. If tests are incubated for more than 2 hrs., somatic agglutination may yield confusing results.

*Preparation of Immune Sera—*Cultures for rabbit immunization should be plated and checked for smooth colony form. When diphasic cultures are used the strain should also be stabilized in the proper phase, if necessary by cultivation in semi-solid agar containing serum of the type to produce the desired phase variation (Wassen,³ Bruner and Edwards⁴).

For immunization, motile broth cultures are formalinized (0.3 per cent) and injected into rabbits in 0.5, 1.0 and 2.0 ml. doses at 5–7 day intervals. In nearly all instances 3 injections yield sufficiently potent sera and rabbits can be exsanguinated in 2 or 3 bleedings giving a total serum yield of 75–100 ml. per rabbit. Sera and typing fluids are preserved with 0.5 per cent chloroform or 0.5 per cent phenol.

*Standardization of Sera—*For diagnostic typing of *Salmonella* cultures, sera must be used in dilutions which give specific reactions with the main antigens present in the various *Salmonella* types. For somatic tests, titrations are made by the slide test technic described above, using 1:10, 1:20, and 1:40 dilutions of serum, each tested with representatives of the various somatic groups. The dilution which gives a rapid and strong, yet specific, reaction is selected for the typing fluid; a 1:20 dilution is usually satisfactory. For example, serum for the B group may give some cross with the XII antigen of the D (typhoid-enteritidis) group in 1:10 dilution but in 1:20 or higher dilution may react only with the IV and V antigens. Adsorbed sera may be necessary to distinguish between subdivisions of a group as in the case of the E group, all members of which contain somatic antigen III in association with either X, XV, or XIX. If dilutions of the sera will not yield typing fluids specific for the X and XV components, the III antigen must be removed by adsorption. Adsorptions of other somatic antisera have not been found necessary for diagnostic typing.

Sera for flagellar reactions are standardized by the tube test. The serum is tested undiluted and in serial dilutions with representative strains having one or more antigenic components in common with the immunizing strain, including antigens of both phases if the culture is diphasic. The dilution specific for a single flagellar antigen, or for a combination which is of diagnostic value, is selected as the typing fluid.

Adsorbed monovalent sera for flagellar antigens, especially for the non-specific factors 2, 3, 5, 6, and 7, are needed for strain differentiation in occasional instances. For example, *Salmonella oregon* and *Salmonella give* differ from closely related types by only one of several components of the nonspecific phase. Other instances in-

volving either phase of certain diphasic types and even a few monophasic types could be cited.

Application to Diagnostic Typing—At the present time there are 109 types, excluding coliform types,* which have been described in the *Salmonella* genus. These include somatic antigens I-XXXIV and some 64 flagellar antigens. Additional types are continually being added to the list. While the prospect of diagnostic typing may at first appear impractical, actually the majority of types which will be encountered can be classified with relatively few sera.

Table 1 shows the types used for production of sera for somatic grouping that are in use in Connecticut. The

same results can be obtained by using other types to obtain comparable sera. Adsorption has been necessary only with the X, XV, and Vi typing fluids. With an unknown culture, agglutinations are made first with the 8 typing fluids covering somatic groups A-E and their subdivisions. The C group can be split readily into the VI-VII and the VI-VIII divisions by using VIII serum (*amherstiana*). The E group likewise is divided into its 3 subgroups (III X; III XV; III XIX) by agglutination in specific typing fluids. The cultures which do not agglutinate in the 8 sera are tested with the remaining somatic sera. The table also illustrates the manner in which somatic grouping sera may

TABLE 1
Salmonella Types Used for Antiserum Production

| Somatic Groups | Type | Antigenic Formula* | Diagnostic Components Utilized | Phase Used |
|----------------|---|--|--------------------------------|------------------------------------|
| A | <i>paratyphi</i> | (I). II. XII; a — — — — | I. II; a | (monophasic) |
| B | <i>schottmuelleri</i> var. <i>Java</i> | (I). IV. V. XII; b — — — | IV. V; b | (monophasic) |
| C | <i>choleraesuis</i> var. <i>Kunzendorf</i> <i>amherstiana</i> | VI. VII; — — — 1, 5... VIII; lv — 1, 6... | VII; 1, 5 VIII; 1, 6 | (monophasic) Phase 2 |
| D | <i>typhi</i> | IX. XII. (VI); d — — — | IX. XII; d | (monophasic) |
| E | <i>london</i> <i>new brunswick</i> <i>senftenberg</i> | III. X. XXVI; lv — 1, 6... III. XV.; lv — 1, 7... I. III. XIX; gst . . — — — | X; lv XV; 1, 7 XIX; gst | Phase 1 Phase 2 (monophasic) |
| Others | <i>typhi</i> Vi1 | (IX.) (XII.) Vi; — — | Vi | (non-motile) |
| | <i>rubislaw</i> | XI; r — enx... | XI; r | Phase 1 |
| | <i>worthington</i> | I. XIII. XXIII; lw—z | XIII. XXIII; lw | Phase 1 |
| | <i>onderstepoort</i> | (I) VI. XIV. XXV; eh—1, 5... | XIV. XXV; eh | Phase 1 |
| | <i>hwittingfoss</i> | XVI.; b—enx... | XVI; enx | Phase 2 |
| | <i>kirkee</i> | XVII; b—1, 2... | XVII; 1, 2 | Phase 2 |
| | <i>cerro</i> | XVIII; z ₁ ... — — — | XVIII; z ₁ | (monophasic) |
| | <i>kentucky</i> | (VIII.) XX; i—z ₀ ... | XX; z ₀ | Phase 2 |
| | <i>minnesota</i> | XXI. XXVI; b—enx... | XXI | Either |
| | <i>tel-aviv</i> | XXVIII; y—enz ₁₅ ... | XXVIII; enz ₁₅ | Phase 2 |
| | <i>ballerup</i> | XXIX. Vi; z ₁₁ — — — | XXIX. Vi; z ₁₁ | (monophasic) |
| | <i>urbana</i> | XXX; b—enx... | XXX. | Either |

* Antigenic components in parentheses may be lacking.

* Kauffmann (loc. cit.) lists several (*S. coli* 1-5 and *S. arizona*) in his diagnostic Schema. The authors are not in agreement with this terminology although recognizing the occurrence of *Salmonella* antigens in other genera.

be used for flagellar typing fluids.

Once the somatic group has been determined, sera for the flagellar reactions may be selected readily. Reference to a

list of *Salmonella* types† will show what flagellar antigens occur in the various somatic groups. The most nearly complete list is given by Kauffmann.² Preparation of 10 sera in addition to those also used for somatic typing fluids has yielded a representative group of sera by which all strains that have been isolated in Connecticut can be typed. Included in the group, in addition to those shown in Table 1, are sera for flagellar antigens c, fg, i, k, mt, gom, y, z, and z₂₇, and adsorbed single factor sera for phase 2 components 2, 3, 5, 6, and 7. This list is by no means complete, yet will probably need little revision for use with cultures isolated in other sections of the United States. For the minimum service, flagellar sera for b, d, i, and a nonspecific phase antigen only are needed.

Salmonella cultures frequently have been found upon isolation to be entirely in one phase. In instances when these are not recognizable as monophasic types or cannot be identified unless antigens of both phases are known, phase variation can readily be produced by growth in semi-solid agar containing flagellar antiserum homologous to the phase isolated.^{3, 4} Rarely an adsorption with the unknown strain has been necessary to identify the flagellar antigens. It is to be expected that occasionally a new type of *Salmonella* may be encountered. In these instances, assistance by a National Salmonella Center is essential.

SALMONELLA TYPES IN CONNECTICUT

Salmonella typing was started in 1939 in the Bureau of Laboratories with two objects in mind: (1) to differentiate between true paratyphoid B (*schottmuelleri*) strains and similar types of animal origin, and (2) to determine the

somatic groups to which other strains belonged. Hence, during 1939 there were a number of types which were identified as to somatic group only. During the latter portion of that year, certain cultures were submitted to the National Salmonella Center, Lexington, Ky., for identification. During 1940 the service was expanded and has since been amplified until there is now little need to use the services of the Salmonella Center except to confirm results or to study new types.

Table 2 shows the *Salmonella* types obtained over a period of 45 months (January 1, 1939–September 30, 1942). The two types of human origin, *typhi* and *schottmuelleri*, comprising 56.7 per cent of the total number, are listed first. In all, 23 additional types, presumably of animal origin, have been recognized. Four of these (*california*, *pullorum*, *workington*, and *kentucky*) were the first recorded and amply confirmed isolations from man. Two others (*hartford*⁵ and *simsbury*⁶) were new types never before described but the transiency of the carrier state observed in these cases suggested that these are strains of animal origin. Most of the strains of animal origin listed are frequently encountered in fowl in the United States.

The majority of the animal types were associated with acute infections ranging from mild diarrhea to protracted febrile illnesses similar to typhoid fever. An occasional culture was isolated from an individual apparently in good health. Four types, *california*, *senftenberg*, *simsbury*, and *kentucky*, each represented by only one isolation, were not associated with illness.

Chronic human carriers of animal types have been rare in our experience. The convalescent carrier state was usually of short duration but occasionally it extended over several months. Two individuals have yielded

† The following should be added to Kauffmann's list:
S. simsbury — I. III. XIX; z₂₇ — ———.
S. javiana — IX. XII; 1z₂₈ — 1, 5...
S. tennessee — VI. VII; z₂₉ — ———.

TABLE 2
Salmonella Types Isolated from Man in Connecticut
 January 1, 1939–September 30, 1942

| Type | Antigenic Group | Diagnostic Antigenic Formula | | | | New Isolations by Years | | | | Total New Isolations (45 Mo.) | Per cent Total Isolations |
|-------------------------------------|-----------------|------------------------------|---------------------|--------------------|------|-------------------------|------|--------------|------------|-------------------------------|---------------------------|
| | | Somatic Antigens | Flagellar Antigens | | 1939 | 1940 | 1941 | 1942 (9 Mo.) | | | |
| | | | Phase 1 | Phase 2 | | | | | | | |
| <i>typhi</i> | D | IX. XII. (Vi) | d... | — | 19 | 49 | 39 | 39 | 146 (40.8) | 56.7% of human origin | |
| <i>schottmuelleri</i> | B | (I) IV(V) XII | b | 1, 2... | 23 | 25 | 4 | 4 | 57 (15.9) | | |
| <i>typhimurium</i> | B | (I) IV(V) XII | i | 1, 2, 3... | .. | 24 | 13 | 16 | 53 (14.8) | 43% of animal origin | |
| <i>derby</i> | | (I) IV XII | fg... | — | .. | 1 | .. | 2 | 3 (0.8) | | |
| <i>brederney</i> | | I IV (XXVII) | lv | 1, 7... | .. | 1 | .. | .. | 1 (0.3) | | |
| <i>california</i> | | IV XII | gmt... | — | .. | 1 | .. | .. | 1 (0.3) | | |
| <i>schottmuelleri</i> var. Java | | (I) IV (V) XII | b | — | .. | .. | .. | 1 | 1 (0.3) | | |
| <i>montevideo</i> | C | VI VII | gms... | — | .. | 4 | 5 | 6 | 15 (4.2) | | |
| <i>oranienburg</i> | | VI VII | mt... | — | 1 | 2 | 4 | 4 | 11 (3.1) | | |
| <i>bareilly</i> | | VI VII | y | 1, 5... | .. | 2 | 4 | 1 | 7 (1.9) | | |
| <i>choleraesuis</i> var. Kunzendorf | | VI VII | — | 1, 5... | .. | .. | 4 | 1 | 5 (1.4) | | |
| <i>hartford</i> | | VI VII | y | cnx... | .. | 1 | .. | .. | 1 (0.3) | | |
| <i>newport</i> | | VI VIII | eh | 1, 2, 3... | 3 | 2 | 5 | 5 | 15 (4.2) | | |
| <i>oregon</i> | | VI VIII | d... | 1, 2, 3... | .. | .. | .. | 3 | 3 (0.8) | | |
| <i>panama</i> | D | (I) IX XII | lv | 1, 5... | 1 | .. | 4 | 3 | 8 (2.2) | mal origin | |
| <i>enteritidis</i> | | (I) IX XII | gom... | — | .. | .. | 4 | .. | 4 (1.1) | | |
| <i>sendai</i> | | (I) IX XII | a | 1, 5... | .. | .. | 1 | .. | 1 (0.3) | | |
| <i>pullorum</i> | | IX XII | — | — | .. | .. | 1 | .. | 1 (0.3) | | |
| <i>give</i> | E | III X XXVI | lv | 1, 7... | .. | 2 | 2 | .. | 4 (1.1) | | |
| <i>anatis</i> | | III X XXVI | eh | 1, 6... | .. | 2 | .. | 2 | 4 (1.1) | | |
| <i>meleagridis</i> | | III X XXVI | eh | lw | .. | .. | .. | 1 | 1 (0.3) | | |
| <i>senftenberg</i> | | I III XIX | gst... | — | .. | 1 | .. | .. | 1 (0.3) | | |
| <i>simsbury</i> | | I III XIX | z ₂₇ ... | — | .. | .. | 1 | .. | 1 (0.3) | | |
| <i>worthington</i> | | I XIII XXIII (VIII) XX | lw | z | .. | .. | 1 | 2 | 3 (0.8) | | |
| <i>kentucky</i> | | | i | z ₀ ... | 1 | .. | .. | .. | 1 (0.3) | | |
| unidentified | B C D | | | | 10 | .. | .. | .. | 10 (2.8) | | |
| Totals—all types | | | | | 58 | 118 | 92 | 90 | 358 | | |

positive stool cultures for *S. bareilly* and *S. worthington* respectively for more than one year; neither of these was acutely ill just prior to the first isolation but both had had intimate contact with domestic animals and both may prove to be permanent carriers. It is interesting to note that two cultures of *S. montevideo* were each isolated from the gall bladder of an individual during surgical operations, an observation which raises the possibility of types of animal origin localizing in that organ in the same manner as species of human origin.

The most important observation to be made from our 45 months' experience is that 43.3 per cent of all new isolations of *Salmonella* types (including the typhoid organism) were strains of animal origin. In other words, in 155 out of 358 cases of *Salmonella* infection, laboratory work indicated that the search for a human carrier as the original source would be of secondary importance and might prove fruitless. By this fact alone, our results prove the value of *Salmonella* typing as a practical diagnostic and epidemiological aid, particularly since

failure to apply antigenic analysis would undoubtedly have resulted in a false diagnosis of paratyphoid B infection or in an incomplete diagnosis in almost one-half the cases studied. To lend emphasis to this point, a number of cultures classified as paratyphoid B in local laboratories have proved to be *typhimurium*, *choleraesuis* or even *oranienburg* in our hands and one "typhoid bacillus" proved to be an anaerogenic *typhimurium*. These had all been "confirmed" by agglutination in commercial antisera.

By a study of Table 2 it will be seen that ability to recognize three serotypes (*typhi*, *schottmuelleri*, and *typhimurium*) would have been sufficient to classify more than 70 per cent of all strains isolated and that the ability to recognize somatic groups B, C, D, and E in addition would have given useful information in 98.9 per cent of cases.

DISCUSSION

Availability of antisera for all known somatic groups of *Salmonellae* has many times enabled us to save much valuable time which would otherwise have been spent in the study of "paracolon" and similar organisms of no proven significance. Many of these are late fermenters of lactose or sucrose so that reporting is considerably speeded up by the early elimination of the possibility of a *Salmonella* type through application of serological methods. Conversely, *Salmonella* antigens have been encountered in coliform and other organisms but always either somatic or flagellar, never both, in a given strain.

Mention has been made of *Salmonella* types isolated from apparently healthy individuals. It has also been pointed out that the carrier state in man is usually transitory for the animal types. This is an important consideration. Let us assume that *S. californica*, an organism with somatic antigens similar to *S. schottmuelleri*, is isolated

from a healthy man who is being investigated as a possible carrier of paratyphoid B. Simple agglutination tests not based upon antigenic analysis would undoubtedly lead to a false conclusion inasmuch as somatic agglutination would occur in paratyphoid B antiserum. The man would, therefore, be considered a paratyphoid B carrier and mistakenly be adjudged the probable source of the outbreak. Besides creating confusion and leading to false epidemiological conclusions, the laboratory report would subject the man to regulatory restrictions of movement and occupation when the strain isolated may very probably have been a transient visitor acquired by close association with infected barnyard fowl or other animals. In Connecticut, even though repeated negative cultures may be obtained following the declaration of the carrier state for paratyphoid B, the carrier cannot be released until a series of cultures taken *at least one year after discovery of the carrier state* is negative. The application of a similar provision to carriers of animal strains seems unnecessary until the permanency of the carrier state has been established for each individual case. It is unjust if, as in the example given above, it rests upon the rather shaky legal ground of a false diagnosis.

Salmonella typing in the public health laboratory raises problems for the epidemiologist who must eventually enlist the services of veterinary and food control officials in breaking the chain of events which leads from infected or carrier animals to infected man. While transmission of animal strains from man to man should not be overlooked as a possibility, the following more probable means of transmission should be uppermost in the thoughts of the investigator: (1) handling of pets and domestic animals; (2) ingestion of raw or incompletely cooked flesh or eggs; (3) contamina-

tion of foods by the droppings of animals such as rats or mice or by flies and other insects; (4) contamination of prepared foods such as cold cuts, salads, and cheese when handled by persons also engaged in dressing fowl and meats.

It is plain that the laboratory services described here will provide the needed evidence for the institution of regulations for the control of the salmonellosis transmissible from animals to man. The framing of such regulations as are feasible is a matter of coöperative effort on the part of public health and veterinary officials. Veterinary bacteriologists and pathologists have already taken the lead in pointing out the importance to man of the animal salmonellosis, particularly those of fowl. Edwards⁷ states: "Several years of work on the *Salmonella* group have disclosed that fowl are the greatest reservoir of paratyphoid infection in the United States." Jungherr⁸ observes: "The control of paratyphoid infections in birds must be viewed from two standpoints, that of man and that of animals."

SUMMARY AND CONCLUSIONS

The value of *Salmonella* typing in a public health laboratory is discussed and the methods used in Connecticut are presented. A public health laboratory should render at least a minimum typing service by which human types may be differentiated from animal types and the main somatic groups (B, C, D, and E) may be recognized. The methods involved are no more complicated than those for pneumococcus typing. Additions to or departure from this basic plan may be desirable in a given locality but should be made only after a sufficiently long experience to obtain a general idea of the types commonly encountered. The assistance of a National *Salmonella* Center should be utilized in any case.

In Connecticut, *Salmonella* typing, originally the minimum stated above, was started in 1939. The results of this service extending over 45 months for a total of 358 cultures have shown: 43.3 per cent of all new *Salmonella* isolations were strains of animal origin, belonging to 23 serotypes; 56.7 per cent were of human origin, represented by 2 serotypes, *S. typhi* and *S. schottmuelleri*. The most common serotypes were as follows: *typhi*, 40.8 per cent; *schottmuelleri*, 15.9 per cent; *typhimurium*, 14.8 per cent. Only 1.1 per cent of the serotypes fell into somatic groups other than B, C, D, and E. Organisms isolated for the first time from man were *S. californica*, *S. pullorum*, *S. worthington*, *S. kentucky*, and two new types—*S. hartford* and *S. simsbury*. Concerning the animal strains, the carrier state in man was rarely prolonged either in convalescents or in healthy individuals and the chronic carrier state is by no means so frequently found as with types of human origin.

Typing of a *Salmonella* culture by means of antigenic analysis is the only procedure by which the laboratory can furnish an authentic report and so save time and effort in the ensuing epidemiological investigation by stressing the relative importance in each case of (1) looking for the human carrier or (2) establishing a chain of events leading from the infected or carrier animal to man.

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Isolation of *Neisseria flava* from the Genitourinary Tract of Three Patients*

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THE cultural method for the diagnosis of gonococcal infection has not only proved to be a useful aid in the diagnosis of the disease, but has demonstrated the presence of *Neisseria* other than the gonococcus in the genitourinary tract.¹ In an epidemiological investigation of gonococcal infection in Glynn County, Ga., during the summer of 1941, *Neisseria flava* was isolated from 3 of 505 patients examined for evidence of gonorrhea. These cases were of interest because all 3 patients presented symptoms similar to those of gonococcal infection, but in no instance was *Neisseria gonorrhoeae* observed in either films or cultures.

The essential information concerning each patient is briefly summarized.

Patient Br.—A 37 year old married colored woman who applied to the Board of Health for a "health card" required for employment as a domestic servant. Gonococcal infection denied. Examination revealed extensive cervical erosions and a moderate purulent discharge. Serologic test for syphilis positive. Films from the cervix revealed no Gram-negative cocci. Predominating organism isolated in culture was *Neisseria flava*.

Patient St.—A 17 year old single colored girl who presented herself at the venereal disease clinic for treatment of a profuse vaginal discharge. Venereal disease denied. Examina-

tion revealed slight erosion about the cervical os and a moderate purulent exudate. Films from the cervix showed no Gram-negative cocci, but cultures yielded *Neisseria flava*.

Patient Th.—A 41 year old married white man who came to the clinic for the treatment of a chronic gonococcal urethritis, which failed to respond to sulfonamide therapy. Admitted several previous attacks of gonorrhea. Was under treatment for syphilis at the time of examination. Examination revealed a moderate, creamy-white, urethral exudate, lighter in color than that characteristic of gonococcal infection. Several large venereal warts were distributed over the dorsal surface of the corona, some of which exuded pus similar to that discharged from the urethra. Microscopic examination of films prepared from the exudate revealed Gram-negative diplococci slightly more spherical in shape than the gonococcus. *Neisseria flava* predominated in cultures; this organism was again isolated 6 days later from the same source.

The patients were treated with sulfathiazole, and subsequent examinations revealed no evidence of either *Neisseria flava* or *Neisseria gonorrhoeae*.

The biologic characteristics of the three strains of *Neisseria flava* were similar. Discrete, opaque, pale yellow colonies, slightly flatter than those of the meningococcus, were formed on chocolate-blood agar. The pigment was barely discernible, except when the organisms were grown on a light-colored medium, such as coagulated blood serum. All three strains of *Neisseria flava* fermented glucose, maltose, and levulose

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

and thus were identified as type ii of Elser and Huntoon, or type iv of Gordon.² Microscopically, the cells resembled those of the meningococcus more closely than those of the gonococcus because of their spherical appearance.

DISCUSSION

To our knowledge, this is the first reported instance of the isolation of the type of *Neisseria flava* described herein from the genitourinary tract of man. The recovery of Gram-negative cocci other than the gonococcus from the genitourinary tract has been reported in the literature, but the meager descriptions of the biologic characteristics of the organisms have made identification uncertain. In 1936, Coutts and Barthet³ reported the recovery of "naso-pharyngeal Gram-negative cocci" from the cervix of two prostitutes. One strain produced pale yellow colonies, failed to ferment any of the carbohydrates, was not agglutinated by an antimeningococcal serum, and was identified as "diplococcus pharyngeus flavus III." The biologic characteristics of the second strain were similar, but production of pigment was not mentioned by the authors. Since the isolation of the three strains of *Neisseria flava* described in this report, Lankford⁴ has recovered the organism from semen in two instances.

Neisseria flava is considered to be part of the normal bacterial flora of the upper respiratory tract, and its presence in the genitourinary tract raises some interesting questions as to the source of

the organism and its ability to produce disease. There are at least two possible explanations for its presence in the genitourinary tract, one, that it was carried there from the upper respiratory passages, and the other, that unusual environmental factors over a period of time altered the biochemical activities of the gonococcus in such a manner that it acquired additional enzyme systems. Fundamentally, *Neisseria flava* differs from the gonococcus only in the possession of two additional enzyme systems, one of which permits the fermentation of disaccharides and the other the formation of pigment. The absence of gonococci in the 3 cases reported suggests that *Neisseria flava* was responsible for gonorrhea-like symptoms observed.

SUMMARY

Three strains of *Neisseria flava* have been isolated from the genitourinary tract of three patients with clinical symptoms suggestive of gonococcal infection.

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Pyrex Suspensions in Turbidimetric and Colorimetric Determinations

Standards of Comparison for Bacterial Suspensions and in the
Resazurin Test

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IT has been difficult in general laboratory practice to prepare reliable standards of comparison for turbidity and turbidity with color, because, while it is possible to establish an adequate color-range with inorganic compounds in acid solution, materials for the simulation of turbidity are neither so readily available nor so satisfactory. In 1939 Brewer and Cook¹ reported that a suspension of Pyrex glass had been found to be markedly superior in the standardization of typhoid vaccine to the suspensions of silica or barium sulfate ordinarily employed as standards of turbidity. Particles of from 0.5 to 3.5 microns in diameter were suspended in distilled water to simulate suspensions of typhoid bacilli; they did not dissolve or aggregate during a 5 year period of storage. The technic of Brewer and Cook has been adapted to the preparation of stable permanent standards of turbidity in the preparation of bacterial suspensions.² Pyrex suspensions in colored media have also been used experimentally as color standards in the resazurin test used in the grading of milk.³ Other possible uses of the suspensions are as standards of comparison for milk of varying natural colors; alpha-naphthoflavone-iodine adsorption compound, a colored suspension that is formed in a test for residual chlorine in water⁴; colloidal complexes of copper or zinc with sodium diethyldithiocarba-

mate; mixed suspension of silver chloride and silver chromate found at the endpoint of the titration of chloride in water; precipitate of barium sulfate encountered with turbidimetric tests for sulfate or barium. For this latter purpose it would be necessary to modify the procedure of decantation to select the larger particles.

BACTERIAL SUSPENSIONS

The modified technic differs from the original in that it employs a longer period of shaking, by which a suspension may be made to the required density without the tedious process of evaporation, and that standardization is by photoelectric colorimeter instead of by particle counting under the microscope. Variations in particle size are limited by specifying both the turbidity and concentration of the stock suspension. In the experimental studies, series of standards were made for direct visual comparison with various bacterial suspensions — pneumococcus, meningococcus, *Bacterium typhosum*. Turbidity was made equivalent to that of the barium sulfate standards then used⁵ and the suspensions were arbitrarily numbered in ascending order as concentration was increased. Each Pyrex standard was prepared in distilled water and in two colored solutions to match the media used for the bacterial suspensions. Without exception, com-

parisons were made more readily with Pyrex suspensions because of their similarity to the sample in color, particle size, and turbidity. Pyrex standards have now replaced barium sulfate standards. The rate of settling is so slow that frequent shaking is unnecessary. Stability during storage is an added advantage.

PREPARATION OF STOCK SUSPENSION OF PYREX GLASS

Break discarded Pyrex glassware into $\frac{3}{4}$ " or smaller chips. Fill a Pyrex bottle, $6\frac{3}{4}$ " in diameter and fitted with a Pyrex glass stopper, to a depth of $2\frac{1}{2}$ " with chips. Clean the chips and bottle. Just cover the chips with distilled water and shake for two 6 hour periods in a machine operating at 130 cycles per minute with a 2" stroke which should provide for violent agitation of the chips. Use fresh water for each period of shaking. Again cover the chips with distilled water and shake for the third time until the suspension approximates the opaqueness of skim milk; the time required will vary from 24 to 120 hours (not necessarily consecutive), depending upon whether freshly broken chips are used.

Transfer the suspension to 1 liter cylinders, cover, and let stand for 48 hours to allow the coarser particles (2 microns) to settle. Decant supernate; allow to settle 24 hours and decant again. Determine the turbidity of the decanted suspension in a photoelectric colorimeter, Luximeter (L) or Klett-Summerson (KS). Use test tubes and a blue filter with the latter. Dilute with distilled water if necessary to bring L to 40 or KS to 590. If too dilute, return the suspension to

the original bottle containing the glass chips, shake further in the machine, repeat the settling and decantation procedure, dilute to the standard turbidity, and determine the dry-solids content. If less than 0.20 per cent, return the suspension to the cylinders used for the second decantation, mix, and let settle for a shorter period to retain a higher proportion of large particles; if more than 0.25 per cent, use a longer settling period to retain a lower proportion. (The suspension we have actually used is 0.22 per cent. How closely this should be approximated would depend upon the precision required.)

Standards for Bacterial Suspensions

Prepare standards by dilution and calibration in a photoelectric colorimeter as indicated in Table 1. The diluent is distilled water or a colored medium.

Make standards resembling beef-extract or bile-peptone solutions by mixing one volume of diluted stock Pyrex suspension with two volumes of the color solution. Use a dilution of one volume of distilled water with two volumes of color solution for the zero setting of the colorimeter that is used. These suspensions settle slowly and should be mixed after several hours' standing.

Beef-extract broth color solution—Dissolve 1.245 gm. of potassium chloroplatinate (K_2PtCl_6) and 1 gm. of cobalt chloride ($CoCl_2 \cdot 6H_2O$) in distilled water. Add 100 ml. of concentrated hydrochloric acid and dilute to 1 liter.

Peptone-bile color solution—Dissolve 2 gm. of potassium chloroplatinate (K_2PtCl_6) and 3.75 gm. of copper sulfate ($CuSO_4 \cdot 5H_2O$) in distilled water. Add 100 ml. of concentrated hydrochloric acid and dilute to 1 liter.

Dispense the suspensions in round-bottomed vials, 15 or 19 mm. outside diameter, marked

TABLE 1
Dilution and Calibration of Pyrex Suspensions

| Turbidity Standard | Approximate Concentration of Stock Suspension | Turbidity as Indicated by Photoelectric Colorimeter Scale Readings | |
|-----------------------|--|---|-----------------|
| | | Luximeter | Klett-Summerson |
| No. | Per cent | L | KS |
| 0.5 | 3.32 | 95 | 40 |
| 1 | 8.34 | 89 | 100 |
| 2 | 18.8 | 78 | 210 |
| 3 | 30.0 | 70 | 290 |
| 4 | 39.6 | 63 | 360 |
| 5 | 52.2 | 57 | 420 |
| 6 | 60.5 | 53 | 460 |
| 7 | 66.7 | 50 | 490 |

at the initial liquid level (bottom of meniscus), and equipped with moulded screw caps. Since these colored standards are acid, the cap lining must be acid resistant. Examine the suspensions with photoelectric colorimeter at intervals of 6 months, or whenever the level of the liquid becomes lower than the graduation mark on the vial, and adjust the concentration if necessary.

RESAZURIN TEST OF MILK

Successful application of the resazurin test for the grading of raw milk according to sanitary quality is dependent upon reliable standards for color comparison in the range from blue through shades of purple to red, to pink, and to white. It has been found difficult in this laboratory to prepare resazurin-treated milk representing the maximum blue or red upon which Ramsdell based the preparation of his standards.³ Experience with the Pyrex turbidity standards encouraged the hope that these suspensions might also be used as permanent standards simulating milk. The stock suspension was allowed to settle only long enough to remove the coarsest particles. Inorganic color solutions were added to provide a series with which any of the colors encountered in the test could be matched. These standards, given arbitrary numerical designations, were used satisfactorily in a preliminary study of the resazurin test and the

resazurin-rennet test⁶ in natural daylight or under artificial reflected light—a fluorescent “daylight” lamp. They were also used in the field for a year and showed no deterioration in careful comparison with freshly prepared standards.

No attempt has been made to correlate with milk-quality the arbitrary numbers assigned to the color standards. Rather, it is hoped that this correlation and also standardization in terms of an accepted color-recording system may be undertaken by investigators who are studying the test. Certainly the utility of the resazurin test will be more readily determined if the standards can be easily prepared in any analytical laboratory. Davis⁷ has suggested that the establishment of a color standard be delegated to an international committee.

White Suspension—With distilled water prepare a suspension concentrated to resemble skim milk as described in the preparation of Pyrex standards for bacterial suspensions; allow to settle only 5 minutes to remove the coarsest particles. Adjust the concentration by dilution or further shaking so that 1 ml. in 100 ml. has a Luximeter reading of 83 or 84 or a Klett-Summerson reading of 160 to 150.

Blue Suspension—Prepare a concentrated white Pyrex suspension. Adjust so that 1 ml. in 100 ml. has a Luximeter reading of from

TABLE 2

Preparation of Permanent Standards for the Resazurin Test

| Color Range | Turbidity Standard | White Suspension | Blue Suspension | Red Solution | Yellow Solution |
|-------------|--------------------|------------------|-----------------|--------------|-----------------|
| | No. | ml. | ml. | ml. | ml. |
| | 13 | 1.85 | 3.00 | 0.15 | 0.00 |
| Blue | 15 | 2.84 | 2.00 | 0.16 | 0.00 |
| to | 17 | 3.83 | 1.00 | 0.17 | 0.00 |
| red | 19 | 4.82 | 0.00 | 0.18 | 0.00 |
| to | 21 | 4.87 | 0.00 | 0.13 | 0.00 |
| milk | 23 | 4.93 | 0.00 | 0.07 | 0.00 |
| color | 25 | 4.98 | 0.00 | 0.00 | 0.025 |

Note: In the Munsell Color Notation⁸ the turbidity standards were interpreted as follows: No. 13, [5.0 PB] 7/3; No. 15, [7.5 PB] 7.5/4; No. 17, [P] 8/2; No. 19, [2.5 RP] 8/4; No. 21, [5 RP] 8/4. The delicate gradations from No. 17 could not be indicated with the same exactness as for the lower numbers. It would seem that advantage could be taken of the highly developed Munsell notation if a practical field outfit could be developed, for example, colored strips mounted in test tubes for comparable examination with the treated sample.

80 to 82 or a Klett-Summerson reading of 190 to 170. Dissolve 15 gm. of copper sulfate ($\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$) in about 75 ml. of the suspension, add 1.6 ml. of concentrated sulfuric acid, and dilute to 100 ml. with more of this suspension. This should have a Luximeter reading in the same range as the white suspension in a 1:100 dilution. The Luximeter should be adjusted to 100 with a distilled water solution of 15 gm. of copper sulfate and 1.6 ml. of sulfuric acid in 100 ml. Adjust the turbidity, if necessary, by preparing suspensions of higher or lower Pyrex content, maintaining the same concentrations of copper sulfate and acid.

Red Solution—Prepare a distilled water solution of 476 gm. of cobalt chloride ($\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$) and 100 ml. of concentrated hydrochloric acid per liter of solution.

Yellow Solution—Prepare a distilled water solution of 2 gm. of potassium dichromate ($\text{K}_2\text{Cr}_2\text{O}_7$), 38 gm. of cobalt chloride ($\text{CoCl}_2 \cdot 6\text{H}_2\text{O}$), and 8 ml. of concentrated hydrochloric acid per 100 ml. of solution.

Dispense the standards in vials of 15 mm. outside diameter having screw caps with acid-resistant linings and a graduation mark at the initial liquid level (top of meniscus). Whenever the liquid level is low due to evaporation, make up to volume with distilled water. At intervals of 6 months or at any time when portions of the suspension have become so packed that they cannot be resuspended, discard and replace with freshly prepared standards.

SUMMARY

Methods are given for the preparation of Pyrex glass suspensions as standards of turbidity.

Pyrex suspensions in colored media have been substituted for suspensions of barium sulfate in the standardization of bacterial suspensions and have been

employed experimentally in the resazurin and resazurin-rennet tests for the grading of milk. The glass suspensions closely resemble bacterial suspensions in appearance, settle slowly, and remain stable longer than those of barium sulfate. In the resazurin test, Pyrex suspensions in colored media have the advantage of being directly reproducible from readily available materials. Standardization in terms of an accepted color-recording system and in relation to milk-quality is suggested.

Pyrex standards have been found to be stable for at least one year.

Various uses for Pyrex suspensions are suggested.

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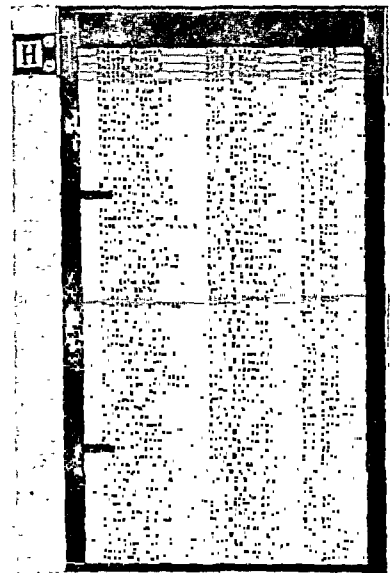
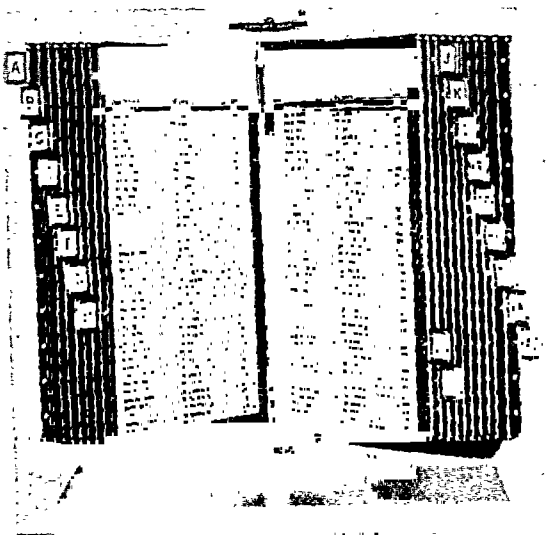
The Single Line Index as an Administrative Aid*

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STAFF depletion due to the demands of military services requires that the remaining health department personnel train and utilize lay assistants to the fullest extent, thus relieving professional public health workers of minor tasks. Similarly, clerical pro-

single line visible index, is particularly helpful. Arranged in panel form with a guide strip giving the headings for the entries on the separate index strips and utilizing strips and signals of different colors, it is possible to envision at a glance the significant details of each



Courtesy of Remington Rand, Buffalo; and Acme Visible Records, Inc., Chicago

FIGURE 1—Desk stand and a single panel.

cedures may be overhauled profitably and devices adopted to conserve further the time of the administrator and field worker. Such a device, namely, the

individual case as well as the over-all status of the particular public health activity for which it is used. Since the device is a visual aid, it may be likened administratively to the spot map of the epidemiologist.

Single line visible index panels (Figure I) have been in use for many

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years to provide quick reference for lists of names or cases but only in isolated instances has their use been extended. Such an extension was developed in 1938 at Vanderbilt University to provide a simple method of promptly determining patient attendance and delinquency at syphilis clinics.¹ Impressed by the possibilities of the device, our department proceeded to experiment with it. The first application was in connection with venereal disease clinic data, the panel system now in use representing an amplification of that installed by the Vanderbilt clinic. This proved so useful, the same principle was applied to tuberculosis contact examinations, the inspection and follow-up of violations of pasteurizing plants, case visitation by public health nurses, etc.

It should be emphasized that single line index panels present no new information. Their value lies in bringing together in visual form on a strip $\frac{1}{4}$ inch wide by 6 inches long selected information obtained from the various records, inclusive of action taken in connection therewith, for each case carried. Since the standard 15 inch panel accommodates fifty separate strips on each side, the worker and the supervisor can determine at a glance the progress or lack of progress in connection with the project as a whole, as well as note individual cases needing specific attention. The ease with which tabulations may be made greatly facilitates statistical analysis and the preparation of reports, thus resulting in a saving of time and labor if previous methods of obtaining the same information are taken into consideration.

Decision to make use of single line visible index panels for a particular public health activity depends on the administrator's need for such a tool. While the principle involved may be applied to a variety of public health activities, the purpose to be achieved

must be given careful thought. In designing a panel system, only a minimum number of items should be included and these should be selected carefully to assure adequate evaluation of the project as a whole, as well as of its component parts.

To show how single line visible index panels have been developed by our department for local use, several examples are illustrated in the charts accompanying this article.

USE AS A ROSTER OF TUBERCULOSIS CONTACTS AND EXAMINATION APPOINTMENTS

The panels consist of single line strips arranged by nursing districts, with the cases (blue strips) in alphabetical order, each case being followed by its contacts (buff strips). Two guide strips (salmon color) are inserted at the top of each panel as shown in Figure 2 which is a reproduction of a portion of a tuberculosis roster panel now in use. The first guide shows how a green transparent signal used in connection with clinic examination appointments functions. When placed at the extreme left, it indicates that the case is dead; has moved; is in a sanatorium; or is under the care of a private physician who does not wish the case visited. An entry is made above the surname to indicate the reason. If the signal is placed under a particular month, appointment for examination at the clinic has been made for that month during the current year. If placed under the column headed "Delinquent," the patient failed to keep the appointment and is delinquent. When placed at the extreme right, an appointment has been scheduled for a future year and the appropriate penciled entry is made after erasing any previous notation in this column. At the first of the new year, signals are moved to the proper month position for the then current year. The absence of the green

| TBC. ROSTER OF CONTACTS & CLINIC APPTS. | | | | | | | | | | | PHS Zone #1 | | | | Discharge | Yr. Rep. | | | | | | | | | |
|---|-------|---|---|---|---|---|---|---|---|---|-------------|------------|----|---|-----------|----------|----|-------|-------|------|--|--|--|--|-------|
| J | F | M | A | M | J | J | A | S | O | N | D | Last Exam | | | | | | | | | | | | | |
| NAME | | | | | | | | | | | ADDRESS | | | | | | | | | | | | | | |
| Ash | John | | | | | | | | | | | 25 Main St | 90 | M | | 35 | 40 | 42 | | | | | | | |
| Ash | Mary | | | | | | | | | | | | 93 | F | JA | 35 | 40 | 42 | | | | | | | |
| Ash | Paul | | | | | | | | | | | | 32 | M | JA | 35 | 40 | | | | | | | | 6/42 |
| | Mary | | | | | | | | | | | 15 West Av | 31 | F | Act | 41 | 41 | | | | | | | | |
| Bean | Leon | | | | | | | | | | | | 00 | M | MB | 41 | | | | | | | | | |
| Bean | Mae | | | | | | | | | | | | 02 | F | MB | 41 | | | | | | | | | |
| Bean | Rose | | | | | | | | | | | | 98 | F | MB | 41 | | | | | | | | | |
| Adams | Lee | | | | | | | | | | | | 27 | F | MB | 41 | | | | | | | | | |
| Bell | Irma | | | | | | | | | | | 18 Main St | | | | 37 | 39 | 42 | | | | | | | 9/42 |
| Bell | Ellen | | | | | | | | | | | | 09 | F | ID | 39 | | | | | | | | | 12/42 |
| Bell | Mark | | | | | | | | | | | | 06 | M | ID | 39 | | | | | | | | | |
| Long | Alex | | | | | | | | | | | | | | ID | 39 | 41 | | | | | | | | 9/42 |
| Long | Eva | | | | | | | | | | | | | | ID | 39 | 41 | | | | | | | | 9/42 |
| Cox | Earl | | | | | | | | | | | 53 Cody St | 08 | M | | 41 | | Disch | 5/42 | | | | | | |
| Cox | Frank | | | | | | | | | | | | 04 | M | | 41 | 41 | 42 | | | | | | | 10/42 |
| Cox | Edna | | | | | | | | | | | 54 Main St | 14 | F | | 41 | 41 | 42 | | | | | | | 10/42 |
| Cox | Ruth | | | | | | | | | | | 54 Main St | 13 | F | MC | 41 | 41 | | | | | | | | 5/42 |
| DISCHARGED CONTACTS | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cox | Anne | | | | | | | | | | | | 10 | F | MC | 41 | 41 | 42 | Disch | 7/42 | | | | | |
| Bean | Inez | | | | | | | | | | | | 80 | F | MB | 41 | 41 | 42 | | | | | | | Nov |
| Cox | Eva | | | | | | | | | | | | 05 | F | MC | 41 | 41 | 42 | | | | | | | Nov |

FIGURE 2—Panel as tuberculosis contact roster and follow-up on clinic appointments. Cases on blue strips; contacts on buff. As color could not be photographed, contacts are indented.

signal on a strip indicates that no appointment for examination has been scheduled.

The second guide strip at the top of the panel gives the headings for the entries to be made on the index strips, most of which are self-explanatory. It has been our practice to post the address of the case but to omit posting the address of the contacts unless different from that of the case. The item "color" is omitted in areas where it is not a factor. Under the heading "Act. or Source," the entry on the case strip indicates the degree of infectivity of the case and is posted in code; whereas for the contact strip, the initials of the source case are used. If a case has no contacts, the entry "O" is also posted in this space. Under the

column headed "Yr. Rep.," entry of the year reported is posted for cases; whereas for contacts, the year added to the record is used. Examinations prior to the installation of the panels are noted by posting the year of the last known examination under the heading "Last Yr. Exam." with an entry directly above this figure to indicate the total number of previous examinations. Subsequent examinations are shown by entering the year in one of the four columns provided for this purpose. A tally mark is placed above this entry to show the number of examinations made during the specific year. Advance appointment dates are entered in the last column of the strip. It has been our practice to make all entries in pencil for items subject to

change. To care for contacts discharged from supervision, the contact strips with notation of the reason for discharge are placed at the bottom of the panel to await tabulation before being destroyed. If a contact is found to be a case, the contact strip is moved to the discharged section of the panel

and a case strip is inserted in the active section. An entirely separate panel or section thereof, not shown in Figure 2, with strips of a third color is used for clinic registrants who are neither cases nor contacts.

With the foregoing explanation in mind and a reasonable amount of prac-

| VENEREAL DIS. CLINIC - | | White - Male | |
|------------------------|-------------|--------------|-----|
| Name | Address | T/B | Sex |
| Banks, Mac | 23 South Av | 120 | M W |
| Borth, Bill | 26 Moore Av | 116 | M W |
| Day, Robt. | 19 St | 102 | M W |
| James, Bart | 24 May Pl | 138 | M W |
| Jones, John | 16 North Av | 122 | M W |
| Kahn, Harry | 17 West St | 124 | M W |
| Mace, Harry | 16 East Av | 124 | M W |
| Wack, Jack | 19 Elm St | 110 | M W |

Color of strip indicates Disease or Disease & Stage:
 Salmon - early syphilis Buff - late syphilis
 White - congenital Blue - gonorrhea

Signal in 1st third of strip indicates a Delinquent
 center " " " Attendance at Clinic

PASTEURIZING PLANTS - Inspections & Follow-up of Violations

| Previous Year | Current Year | | | |
|----------------------------|--------------|-------|-------|-------|
| | Qtr 1 | Qtr 2 | Qtr 3 | Qtr 4 |
| Blue Hill Dairy, Dryden RD | | | | |
| Star Dairy Farm, Weston | | | | |
| J C Downs, Dryden | | | | |

Signal is placed in quarter of last inspection:
 Green signal indicates no violation found
 Blue " " minor " found
 Orange " " major " "

CASE INDEX

| Name | Address | Type | Grade | PHN Zone #1 |
|--------------|------------|------|-------|-------------|
| Leo Ruth | 59 Main St | ST | 1 | 4/16/42 |
| Doe Eva | 34 East Av | Sch | 3 | |
| Doe Elsie | 34 East Av | PS | 2 | |
| Doe Mrs Ann | 34 East Av | Can | 1 | |
| Doe May | 34 East Av | Inf | 2 | |
| Doe Mrs Jane | 34 East Av | Nat | 2 | |

Color of strips Color of Signals
 Salmon - Maternity Green - visited in current year
 Blue - Short term service Orange - new to service this year
 Buff - All other

Grades
 1 - intensive supervision 2 - routine 3 - occasional visit

FIGURE 3.—Other uses of panel as clinic record or guide for inspections and visits.

tice, it is possible to review the panels quickly for significant factors, and to sum up as to the adequacy of control activities in a particular area. Contacts never examined as well as those examined excessively stand out boldly. Failure to have contacts adequately examined where exposed to a case with positive sputum as well as the need to separate such case from its contacts is immediately evident. Similarly, examination of a disproportionately large number of contacts from the youngest age group (0-14 years) can be demonstrated and attention called to the need for adult contact examinations where efforts may be spent more profitably. Cases lacking an entry as to the activity of the infection and therefore the degree of infectivity, signal a need for a review of such cases with the tuberculosis clinician. Contacts delinquent for examination, if occurring in appreciable numbers indicate the need of further study and possibly nurse instruction in the technic of scheduling appointments or perhaps the formation of night clinics in areas where delinquency is confined chiefly to adult males.

Tabulations may be made quickly by sex and age groups of contacts previously examined, those examined during the current year and those examined for the first time during the current year. Other possible summaries include contacts discharged with reasons therefor, contacts added during a current year and number examined, contacts of cases reported in the current year and number examined and number of cases for which contacts are un-

known. Such tabulations will aid the administrator in assuring a vigorous program for the eradication of tuberculosis.

USE AS A CLINIC RECORD OR GUIDE FOR INSPECTIONS AND VISITS

Simple but useful employment of index panels to visualize pertinent data relative to the clinic attendance of venereal disease cases, the supervision of pasteurizing plants and the visitation of cases by nurses is shown in Figure 3. Limitation of space permits reproduction of only a portion of such panels; therefore, the explanatory information at the bottom of the charts is confined to the material shown and does not cover obvious omissions concerning other contingencies. The purpose of displaying additional examples is to suggest possible ways in which single line visible index panels may be profitably utilized, leaving it to the ingenuity of the individual to develop a system of guide strips and colored signals to satisfy particular needs.

SUMMARY

The use of single line visible index panels permits the worker and supervisor to evaluate at a glance the status of the particular public health activity for which it is used as well as to note individual cases needing specific attention. Since the device is a visual aid, it may be likened administratively to the spot map of the epidemiologist.

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Ways to Community Health Education*

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THE field of health education is so wide in its scope, and its activities are so multiple and complex, that it is impossible for a single method or a standard procedure to be useful in all the cases and circumstances; consequently, the ways to health education are many, and extremely varied.

In the present chart I have endeavored to classify schematically the ways which a health educator—either a health officer, a nurse, or a social worker—should have in mind to carry on his duties in the field, or in the classroom.

I think that Health Education, in general, comprehends two great groups of activities: Health Propaganda and Health Instruction. The first one includes both Health Information to individuals and Health Publicity to a community as a whole. Health instruction is concerned with school and college health education and with the training of professional personnel; i.e., physicians, engineers, dentists, midwives, inspectors, nurses, and teachers. The technic of both health propaganda and health instruction can be comprehended in two main items:

A. ACTUAL PRESENTATION OF TOPICS

In this item are included all the ways and means through which a topic or theme is actually presented or exhibited

to any audience. The topic in question can be presented in two different ways: (a) By display of objective materials, as in an exhibition of a definite sort of materials in windows or cases, e.g., clothes for maternal and child hygiene use; different kinds of diets for nutrition, and dietetic suggestions; or (b) by demonstration, as to the correct use of a toothbrush in mouth hygiene; the methods of preparation and cooking of foods before a mother's club; training of health officers and nurses in health districts, etc.

B. DESCRIPTION OR REPRESENTATION OF THE THEME

The theme or topic is represented in a manner designed best to attract and sustain the attention of the public. This aim or objective can be attained by auditive, visual, or audio-visual aids, or by other miscellaneous devices:

AUDITIVE AIDS

Among the auditive aids the spoken word sometimes may be coördinated with music and poetry, because the rhythm of a poem and the melodies of music are two excellent ways to carry any message to an individual, to an audience, or to the general public.

Oral propaganda, as well as instruction, can be delivered in two ways:

1. *Direct*, as when the educator—public health worker or teacher—speaks face to face, directly to a definite, particular, individual or group of persons; in this way, a person's word can be

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delivered in the most favorable conditions both for the educator and for the audience: the speaker is able to explain and to illustrate the theme as extensively as it is pertinent to do so; he is in position to strengthen his arguments or to appeal vigorously to his listeners when doubt arises among them, or when boredom or indifference is shown by the attendants; he has the opportunity to adapt the substance and manner of presentation to the intellectual level of the audience.

2. *Indirect.* When the educator talks to an invisible person or crowd, as through a microphone, telephone, or phonograph record, he is following an indirect method of propaganda and instruction; under these circumstances, any talk or address must be short and clear; laconic, if necessary; energetic, penetrating, more appealing and more suggestive than documentary.

Direct instruction and propaganda can be *indoors* and *outdoors*; it is very important that the educator have in mind this fact, because there is a great difference in the kind of attention paid and the interest taken by the audience when it is addressed in a comfortable, well located place, seated in easy chairs, and when given outdoors, standing in a square or in a parade ground.

VISUAL AIDS

Visual aids to health education are essentially the printed word, pictorial procedure, and models.

1. The printed word, as used in health education, is delivered to individuals or to the public in the form of letters, booklets, leaflets, folders, magazines, journals, books, etc.

Printed material may be delivered to determined groups of persons or addressed to names taken from directories or selected mailing lists: this excellent way of distributing propaganda is called *personal* or direct.

It is entirely different when materials

are delivered to a *general* public or distributed to a promiscuous crowd.

When printed material is distributed to the general public without any discrimination whatsoever, it is done with the hope that a large number of persons have time and willingness to make good personal profit of it; for this purpose fliers, leaflets, folders, and newspapers are distributed, and many other materials destined to be read.

Another way to use printed material as an educational tool is when it is exhibited to the public in places in which there are chances for it to be seen; this kind of propaganda must be extremely brief; very attractive and appealing; showing the topic at a glance, in such a manner that "he who runs may read." This is the way and kind of propaganda to be glanced at.

Materials to be glanced at may be exposed in an intramural environment in the form of posters placed in waiting rooms, inside vehicles, etc., or in extramural places.

The extramural propaganda sometimes can be ambulatory, as that conveyed by men in streets, or outside of buses or trucks; but more commonly it is used in fixed form.

The materials fixed in places in which they are easily destroyed are called transitory, while those more or less enduring constitute a permanent propaganda, like electrical signs, frescoes painted on a wall, posters along a highway, stone signs on the top side of a hill, etc.

2. Pictorial propaganda is based upon pictures or drawings which may represent things or living beings, or may be graphics of deeds and events.

Pictures of things or living beings may be representative of the topic, as a photograph or sketch of a privy in the educational material used with sanitation purposes; it may be purely decorative, as are landscapes; it may be symbolic or allegorical, as the picture of

a monster representing an illness; it may be suggestive, e.g., the well known dog listening and recognizing "his master's voice," which suggests to the public the high fidelity of sounds in certain phonograph records.

Deeds and events may be represented by pictorial statistics, or by a descriptive or narrative series of pictures, as in graphical stories, film strips, and silent movies.

3. There are many instances when things can be very attractively shown in three dimensions: models, lay figures, statuettes, and even monuments or memorials serve for this purpose.

AUDIO-VISUAL AIDS

On using audio-visual aids as a way to health education, both senses, sight and hearing, are employed as happens when attending a demonstration or a

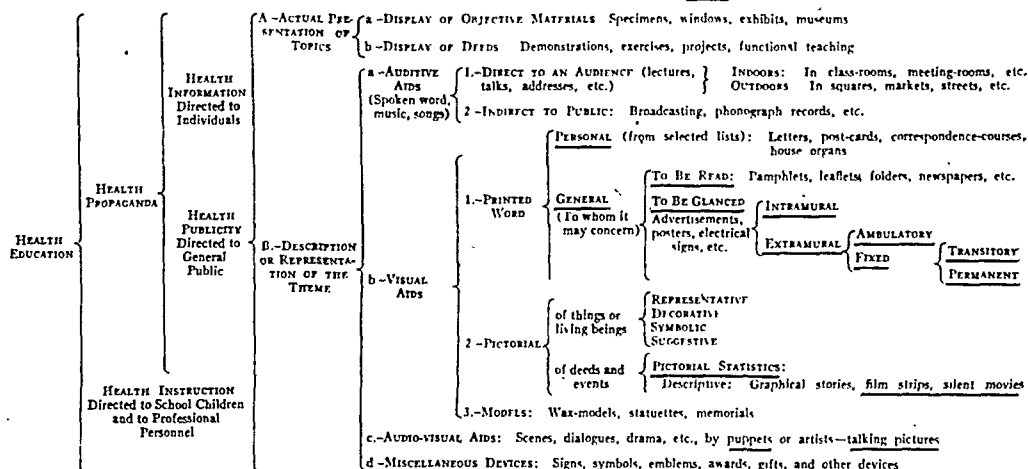
show by puppets or artists. One of the most useful popular and economical forms of health education is talking pictures. For rural health education silent moving pictures are better, provided they are explained personally in plain and easy language by health educators.

MISCELLANEOUS DEVICES

In the item marked miscellaneous devices I include those many and varied "tricks of the trade" like emblems or symbols; dainties for the children; diplomas or other rewards for the winners in health contests; and many other gadgets we are obliged to use in our health educational work, to call the attention, to sustain the interest, to stimulate into action either a person or a group; in short, to attain our goal, i.e., the health and happiness of our people, of all our brethren of the Americas.

WAYS TO COMMUNITY HEALTH EDUCATION

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DEPARTAMENTO DE SALUBRIDAD PUBLICA
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Methods of Transmitting Material to a Laboratory for Gonococcus Cultural Studies*

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A PREVIOUS report¹ on the results of 123 controlled experiments described a method for sending material through the mail for gonococcus cultural studies. One hundred and sixteen additional experiments with slight modifications in technic have since been completed. The technic now used is as follows:

Mix equal amounts of sterile distilled water and defibrinated horse blood. Then add, of 1 per cent aqueous solution of crystal violet, sufficient to make a dilution of 1:30,000. Autoclaving is not necessary, since a 1 per cent solution of crystal violet is likely to remain free from growth. Five mg. of para-amino-benzoic acid are then added to every 100 ml. of the blood-dye solution. Test tubes 6 x 50 mm. are used with cork stoppers to fit (No. 000XXX). Autoclave the tubes which are to contain the blood-dye solution at 15 lb. for 20 minutes. Use a 100 ml. burette to fill tubes approximately two-thirds full (0.6 ml.) with the blood-dye solution. Plug with cork stoppers which have been previously dipped in melted paraffin and kept under 70 per cent alcohol. Invert tubes and seal stoppers with hot

paraffin. A similar number of tubes is used for keeping swabs sterile. Dip cork stoppers in melted paraffin. Cut round toothpicks in half, make swabs at cut ends of toothpicks, and insert pointed ends into stoppers. Place swabs attached to stoppers in test tubes and autoclave at 15 lb. for 20 minutes. Invert tubes and seal stoppers with hot paraffin.

Some difficulty has been caused by the fact that different lots of crystal violet vary in their bactericidal and bacteriostatic properties. The dye used in our experiments was obtained from the National Aniline and Chemical Company, and the lots with an approximate 84 per cent dye content gave the best results in dilutions of 1:30,000. Each new lot of dye is tested by the following method: Swabs of known positive exudates are put into tubes which contain various dye dilutions in the horse blood and water solution. The tubes are kept at room temperature for 24, 48, and 72 hour intervals, after which the swabs are planted on chocolate agar plates which are incubated for 48 hours. The dye dilution that causes the greatest inhibition of streptococci and staphylococci and at the same time permits the gonococci to remain viable is selected for use.

Another difficulty is the technic of obtaining specimens. In the case of

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

females we have had our best results when the cervical canal has been wiped clean with sterile cotton and the fresh material from the deep cervical glands has been utilized. When this method was not followed there were frequently more extraneous microorganisms than could be inhibited by the 1:30,000 crystal violet.

Results with 116 exudates are shown in Table 1.

TABLE 1

*116 Delayed Cultures of Exudates**(All Control Cultures Positive for Gonococci)*

| | | | | |
|---------------------|----|----|----|-----|
| Hours Delayed | 24 | 48 | 72 | ... |
| Number of Cultures | 45 | 51 | 20 | 116 |
| Number Negative | 2 | 5 | 2 | 9 |
| Number Positive | 43 | 46 | 18 | 107 |
| Percentage Positive | | | | 92 |

In the previously reported experiments gonococci were detected by culture in 115 of the 123 exudates that had been in the blood-dye solution from 13 to 72 hours before planting. These and the 116 additional experiments now completed give a total of 239 controlled experiments in which gonococci were detected in 222 plates that were not planted until the exudate had been in the blood-dye solution from 13 to 72 hours, or an efficiency of 93 per cent.

Allison, Charles, and Carpenter² have reported their experiments on the survival time of gonococci in urine in male patients. They worked with uncentrifuged urines and urine sediments. Some of each were kept at 4° C. and at room temperature from 1 to 48 hours before planting. The authors report the survival of 100 per cent of 86 strains up to 3 hours, 84 per cent at 12 hours, 41 per cent at 24 hours, and 2 per cent at 48 hours. When, however, urine specimens were centrifuged and the supernate discarded, gonococci were recovered from 88 per cent of the 17 sediments that had been kept at 4° C.

for 24 hours. The authors reported that the pH of the urine had little if any influence on the results.

Recently we have experimented with delayed cultures of urine specimens. The following technic has been used for collecting these specimens. A patient with a urethral discharge voids into a wide-mouthed sterile receptacle. If no discharge is present the prostate and urethra are stripped and the prepuce is retracted before the patient voids. The glans penis is not cleansed. Into several tubes, each of which contains 1 ml. of defibrinated horse blood, water, and different dilutions of crystal violet, is poured 1 ml. of the urine.

Preliminary studies carried out from June 5 to June 15 revealed that when the urine was combined with the blood-dye solution in strengths greater than 1:120,000 the gonococci were inhibited, but in dye dilutions of 1:120,000 to 1:600,000 the results were sufficiently encouraging to warrant further investigation.

From June 16 to August 1, 320 urine specimens, all of which contained gonococci, were mixed with equal parts of a solution consisting of two-thirds defibrinated horse blood and one-third water. Five mg. of para-amino-benzoic acid were then added to every 100 ml. of the resulting solution. Varying amounts of crystal violet were then added to make, when diluted with the urine, dye dilutions of 1:120,000 to 1:600,000. The tubes are kept at room temperature for 24, 48, 72, or 96 hours, at which times they are centrifuged and the supernate discarded. The sediment is then shaken onto both chocolate agar and starch agar plates which are streaked with a platinum loop. Controls consist of 1 ml. of the same urine specimen which is centrifuged, supernate discarded, and the sediment planted immediately. All plates are incubated under an increased CO₂ tension. Lighted candles in museum

jars are used for this purpose. Plates are read after 48 hours' incubation and suspicious colonies are examined by Gram-stained smears and fermentation tests.

Our results with urines are shown in Table 2. We found that the pH of the urine had no effect upon the results.

Exudates sent to us through the mail in the blood-dye solution were planted in our laboratory. In one instance the delayed culture was negative and the smear was reported positive, and 26 of the delayed cultures were positive when the smears were reported negative. In other words, gonococcal infection that would otherwise have been missed was

TABLE 2
Results of 320 Delayed Urine Cultures
(All Control Cultures Positive for Gonococci)

| <i>G. V. Dilution</i> Hours Delayed | 1-120,000 | | | | | 1-180,000 | | | | | 1-240,000 | | | | |
|--|-----------|----|----|----|----|-----------|----|----|----|----|-----------|----|----|----|----|
| | 24 | 48 | 72 | 96 | .. | 24 | 48 | 72 | 96 | .. | 24 | 48 | 72 | 96 | .. |
| Number of Cultures | 23 | 12 | 13 | 19 | 67 | 22 | 9 | 14 | 12 | 57 | 20 | 11 | 10 | 8 | 49 |
| Number Negative | 3 | 3 | 2 | 5 | 13 | 4 | 1 | 5 | 3 | 13 | 1 | 2 | 3 | 2 | 8 |
| Number Positive | 20 | 9 | 11 | 14 | 54 | 18 | 8 | 9 | 9 | 44 | 19 | 9 | 7 | 6 | 41 |
| Percentage Positive | 80 | | | | | 77 | | | | | 84 | | | | |

| <i>G. V. Dilution</i> Hours Delayed | 1-360,000 | | | | | 1-480,000 | | | | | 1-600,000 | | | | |
|--|-----------|----|----|----|----|-----------|----|----|----|----|-----------|----|----|----|----|
| | 24 | 48 | 72 | 96 | .. | 24 | 48 | 72 | 96 | .. | 24 | 48 | 72 | 96 | .. |
| Number of Cultures | 22 | 9 | 10 | 6 | 47 | 24 | 13 | 10 | 7 | 54 | 18 | 10 | 9 | 9 | 46 |
| Number Negative | 2 | 4 | 3 | 3 | 12 | 4 | 3 | 4 | 4 | 15 | 6 | 2 | 2 | 5 | 15 |
| Number Positive | 20 | 5 | 7 | 3 | 35 | 20 | 10 | 6 | 3 | 39 | 12 | 8 | 7 | 4 | 31 |
| Percentage Positive | 74 | | | | | 72 | | | | | 67 | | | | |

Summary

| | | | | |
|--|-----|----------|-----|-------|
| No. Planted at 24 Hrs. (Exclusive of 1:600,000 dilution) | 111 | Positive | 97 | (87%) |
| " " " 48 " | 54 | " | 41 | (76%) |
| " " " 72 " | 57 | " | 40 | (70%) |
| " " " 96 " | 52 | " | 35 | (67%) |
| Total | 274 | " | 213 | (78%) |

Not included in the above, but possibly worthy of mention, were 56 urines and exudates from patients with active gonorrhea, in which all delayed cultures were positive and 3 routine cultures of exudates and 12 routine urine cultures were negative. Routine cultures were planted within 1 hour after obtaining the material from the patient. During the interval exudates were kept in proteose No. 3 peptone broth.

Routine physical examinations of 367 women inmates of a state institution included cervical smears and cultures.

found by the blood-dye technic in 7 per cent of 367 women inmates.

In a series of exudates from 36 patients, sent to us in the blood-dye solution from a venereal disease clinic located in another city, 6 (16 per cent) of the patients with negative smears were found to be positive by culture.

SUMMARY

We feel that the blood-dye method for transmitting exudates through the mail for gonococcus cultural studies is more efficient than the smear method

in detecting such organisms in women, and in men with chronic or latent infections. We do not at this time recommend the sending of urine specimens through the mail for gonococcus cultural studies as a routine procedure.

However, our experiments with this method justify further study.

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Accidents in the United States

"It is discouraging to observe that at least as many persons died from injuries sustained in accidents every month in 1942 in the United States as there were civilians mortally wounded by enemy air raids on Great Britain in any one month of the war so far. As a matter

of fact, in several months our accident toll exceeded by 1,000 deaths or more the 6,955 British air raid fatalities suffered in September, 1940, when they were at a peak figure." *Statistical Bull.*, Metropolitan Life Insurance Company, December, 1942.

Action of Finely Divided Magnesium upon the Lungs^{*}

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THE recent papers of McCord, Prendergast, Meek, and Harrold,^{1, 2} and of Schultz and Walter³ have focused the attention of American industrial hygienists upon the hazards from metallic magnesium. Their experiments and the observations of several foreign experimenters and clinicians have demonstrated that small particles of this metal embedded in living tissues dissolve with the evolution of hydrogen and the production of an irritating alkaline hydroxide. The tissue response consists of a transitory, acute inflammation which is unique because of the presence of large vacuoles produced by the presence of the gas. When all the metal has dissolved, the inflammation subsides and healing ensues. The amount of residual scar tissue is proportional to the severity of the injury which in turn depends upon the quantity of metallic irritant.

These observations led to the suspicion that dust created in manufacturing and machining magnesium and magnesium alloys might be injurious to the lungs. Inquiry revealed that such hazard could hardly exist in the manufacture of powdered magnesium because the danger of fire and explosion precludes exposure of workmen to appreciable atmospheric concentration of this

mineral. In processing these metals, it was found that many of the operations are not productive of much fine dust. When particles small enough to be inhaled are produced it seems highly improbable that the result observed in the subcutaneous tissue could be duplicated in the lungs. The finest dust would theoretically dissolve on contact with water vapor in the nose, trachea, and large bronchi, liberating hydrogen at points where it could be readily exhaled. Undissolved particles that might reach the terminal air spaces would again exert their specific effects where no pressure could develop. Permanent injury to the pulmonary framework could only result from undissolved magnesium particles which might finally be transported into its structure.

The validity of this reasoning has been tested in a series of experiments upon animals. Actual inhalation of magnesium in the form of dry dust has not been feasible, owing to the danger of explosion, but the same objective could be attained by introducing salt solution suspensions of fine magnesium particles through a tracheal tube. Before making such tests, the capacity of the particular material to produce "gas tumors" was tested by subcutaneous injections.

Procedure—The powdered magnesium used had been ball-milled to pass a 200 mesh screen. The particle size ranged between 1 and 100 microns, the average

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being about 30 to 40 μ , with a moderate amount under 4 μ . Two, 5 and 10 per cent suspensions of this material in 0.85 per cent NaCl solution were prepared immediately before injection. Sterilization was omitted because of the rapidity of solution in a fluid medium. The guinea pigs of the first two groups received injections of approximately 0.5 ml. each; for the cats of group C, the dose was 2 to 3 ml. However, these dosages could not be gauged accurately because of the marked tendency of the larger particles to settle out in a syringe.

Group A—Six guinea pigs injected subcutaneously in the groin; dose approximately 10 mg., killed at intervals of 1, 2, 3, 4, 7, and 21 days.

Group B—Ten guinea pigs injected into the lungs by means of a long flexible needle passed through the larynx and trachea into a stem bronchus without anesthesia; approximate dose, 10 mg. One animal died of pneumonia on the 9th day; the others were sacrificed at the following intervals after injection: 24 and 48 hours, 1, 2, 4, 12, and 16 weeks.

Group C—Five cats injected similarly by tracheal catheter through a small bronchoscope; approximate dosage



FIGURE 1—Reaction in subcutaneous tissue to 10 mg. of magnesium powder at the following intervals after injection: A, 1 day; B, 2 days; C, 3 days; D, 4 days; E, 7 days; F, 21 days. Gas bubbles in A through D. Some chronic inflammation in E. Tissue practically normal in F.



FIGURE 2—Reaction in lungs 24 hours after intratracheal injection of 10 mg. magnesium powder. Note areas of pneumonia in the lobes on the upper and lower right.

ranged 100 to 250 mg. One of them received 1.5 ml. of a 10 per cent suspension and was killed 1 hour later; the other 4 were given about 2 or 3 ml. of a 5 per cent suspension. These last were killed after 48 hours, 6, 8, and 10 weeks.

None of the animals showed any symptoms after the injection, and as noted there was only one death from pneumonia, which occurred 9 days after intratracheal injection. The tissues of all of them were preserved and examined microscopically.



FIGURE 3—All trace of pneumonic reaction has disappeared 4 weeks after injection of 10 mg. of magnesium powder.

Group A guinea pigs demonstrated that this material would produce the typical emphysematous reaction reported by the previous observers. Twenty-four hours after injection, large gas blebs surrounded by acute inflammatory reaction had developed in the subcutaneous tissue. These changes persisted for 3 days. By the 4th day, the blebs were barely visible and healing had begun, as evidenced by proliferation of fibroblasts at the margins of the lesion. At the end of a week, only granulation tissue marked the site of injection and by the 3rd week, practically all traces of reaction had disappeared.

Group B—Guinea pigs in which the same quantity of magnesium was injected directly into the pulmonary air spaces showed comparatively little reaction. In areas where the suspension of particles had lodged, pneumonic reaction developed which persisted in acute form for about a week. Much of this effect was nonspecific in character and was obviously due to the fluid. In extent and severity, it was no greater than many reactions excited by suspensions of more inert particles. The unique feature in these experiments was the early appearance of microscopic vacuoles within the cytoplasm of mononuclear cells projecting from the inner surfaces of the air space walls. Likewise, many of the free wandering phagocytes were fragmented and some showed cytoplasmic vacuoles. Such changes were well defined during the first 2 days but had disappeared by the 7th day. At the latter interval, there was still some evidence of more chronic inflammatory tissue changes, but thereafter the healing and absorption of such elements was progressive. By the 4th month little remained except microscopic thickening of the airspace walls. An exception was noted in one animal, killed 2 weeks after injection, which showed an isolated pulmonary abscess of microscopic dimensions. This lesion was surrounded by

granulation tissue; at the edge of its necrotic center there were still vacuolated mononuclear phagocytes and small giant cells. Minute particles that were presumably magnesium were visible for 1 week; thereafter none could be found.

Group C—The 5 cats in this series showed less reaction of a character similar to that in the guinea pigs. Forty-eight hours after injection vacuoles were prominent in both sessile and free phagocytic cells. Small giant cells had formed about the larger metallic particles, and where the latter had dissolved vacuoles were left. By the 6th week, healing was practically complete, and at the 8th and 10th week nothing remained to mark the site of injury.

COMMENTS

The experimental procedure might be criticised on the grounds that all of the particles of magnesium were not of inhalable dimensions and that they were not sterilized before injection. However, the work of the previous authors cited had amply demonstrated the nature of specificity of the magnesium reaction, and our subcutaneous injections in group A guinea pigs indicated that it was being reproduced. The results in this group also proved that the dosage and particle size were adequate to cause characteristic changes in the subcutaneous tissues. When essentially the same, or in the case of the cats 10 to 25 times this amount of magnesium was introduced into the air spaces of the lung tissue, reaction was much less severe. The alkaline hydroxide was irritating, as manifested by localized patches of pneumonia, but as soon as the soluble irritant had been diluted and removed, inflammation subsided and healed. The specific effects of hydrogen gas were manifested in isolated cells which, because of the peculiar anatomy of the lungs, could be blown to pieces without exerting significant pressures upon surrounding tissues. While the involved

phagocytic cells were killed, thereby adding a further source of irritation, the fact that healing with resolution had occurred within 6 weeks demonstrates the comparative innocuousness of the process. Evidence of injury to the fixed tissues of the pulmonary framework is lacking so that one must conclude that very few particles reached such structures.

Since the reaction to a very large number of magnesium particles introduced into the lungs without trauma in a unit time is so slight and transitory, it is hard to imagine much effect from the smaller number of particles that might reach the pulmonary air spaces by inhalation. Presumably the phagocytes would be destroyed as fast as they ingested particles of the mineral, but others are always available to take their place. The concentration of irritant, both from the metallic particles and the injured phagocytes, would probably be too low to cause much inflammation. The possibility of disabling fibrosis from irritation of fixed tissues is very remote.

CONCLUSION

Finely divided metallic magnesium does not have the same effect upon the lungs that it exerts in the more dense subcutaneous tissues. The absence of "gaseous tumor" formation is explained by the free communication of the pulmonary air spaces with the external air. Even if manufacturing processes permitted inhalation of an appreciable amount of magnesium dust, it is highly improbable that serious injury of the lungs will ensue.

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Milk-borne Outbreaks Due to Serologically Typed Hemolytic Streptococci*

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IN the twenty-five year period, 1917-1941, a total of 168 outbreaks of milk-borne disease have been investigated by the New York State Department of Health. A milk-borne outbreak is defined as one demonstrated to have been transmitted by a common milk

the use of raw milk except two of typhoid fever, one of bacillary dysentery, and one of scarlet fever. The typhoid fever and bacillary dysentery outbreaks were due to pasteurized milk contaminated after processing, and the scarlet fever outbreak resulted from milk

TABLE 1
Milk-borne Outbreaks, New York State
(Exclusive of New York City)
1917-1941

| Disease | Outbreaks | | Cases | |
|--------------------------------------|-----------|-------------------|--------|-------------------|
| | Number | Per cent of Total | Number | Per cent of Total |
| Typhoid and Paratyphoid Fever | 76 | 45.2 | 1,209 | 12.1 |
| Septic Sore Throat and Scarlet Fever | 57 | 34.0 | 6,812 | 68.2 |
| "Gastroenteritis" | 24 | 14.3 | 1,423 | 14.2 |
| Bacillary Dysentery | 5 | 3.0 | 411 | 4.1 |
| Diphtheria | 5 | 3.0 | 123 | 1.2 |
| Poliomyelitis | 1 | 0.6 | 11 | 0.1 |
| Total | 168 | 100.0 | 9,989 | 100.0 |

supply and to have affected persons residing in more than one household. Ten thousand residents of the state, exclusive of New York City, were affected in these epidemics, the smallest involving 3 persons and the largest an estimated 1,100 individuals.

All the 168 outbreaks were traced to

labeled "pasteurized" although evidence indicated that it had not been properly processed.

Table 1 presents the distribution of outbreaks according to the type of milk-borne disease and the number of cases resulting. Although typhoid fever and paratyphoid fever have caused the largest number of outbreaks, 45.2 per cent of the total, only 12.1 per cent of the cases have been due to these diseases. Septic sore throat and scarlet fever outbreaks, comprising 34.0 per cent of those studied, contributed 68.2

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NOTE: Dr. Dublin is now Associate Professor of Preventive Medicine and Community Health, Long Island College of Medicine, New York, N. Y.

TABLE 2

Reported Milk-borne Outbreaks Due to Serologically Typed Hemolytic Streptococci

| <i>Year Reported</i> | <i>Place</i> | <i>Number of Cases</i> | <i>Griffith Type</i> |
|----------------------|----------------------------------|------------------------|----------------------|
| 1936 | Chelmsford, England ⁴ | 1,600 | 2 |
| 1937 | Doncaster, England ⁶ | 364 | 2 |
| 1938 | Mørkøv, Denmark ⁶ | 100 | Not typable |
| 1939 | Pinneberg, Germany ⁷ | 450 | 5 |
| 1939 | Vegle, Denmark ⁸ | 128 | 3 |
| 1939 | Romford, England ⁹ | 18 | 2 |

See Bibliography

per cent of all cases. It is apparent, therefore, that these hemolytic streptococcus infections present the most important public health problem in the upstate New York area in terms of cases of illness resulting from outbreaks of milk-borne disease. Furthermore, very few milk-borne outbreaks of typhoid fever have occurred in recent years, so that hemolytic streptococcus outbreaks have assumed even greater relative importance.

In recent years, the Lancefield classification of hemolytic streptococci¹ has been utilized extensively in the search for the source of milk-borne outbreaks of scarlet fever and septic sore throat. By this means, beta hemolytic streptococci falling into Group A, the group including approximately 95 per cent of strains pathogenic for man, may be distinguished from those belonging to other groups. The value of this serological procedure is emphasized by the findings of Sherman and Niven² who have reported that beta hemolytic streptococci may be recovered from as high as 8.5 per cent of samples of commercial pasteurized milk, and 18.0 per cent of similar samples of raw milk. The prevailing strains isolated by these authors from pasteurized milk proved to be Group D and from raw milk Groups B and C.

The differentiation by Griffith³ of the various hemolytic streptococci pathogenic for man into 30 or more serologically specific types has not only provided a more exact means of identi-

fication of the source of milk-borne outbreaks but also has permitted further study of the epidemiological characteristics of the different strains of these organisms. Since the introduction of this procedure, at least six reports of its use in conjunction with the investigation of apparently milk-borne outbreaks have been published and are summarized in Table 2.

All of these epidemics have been reported in the foreign literature. It is of interest to note that three of the six were attributed to Griffith Type 2 strains.

For a number of years, the Division of Laboratories and Research of the New York State Department of Health has undertaken the collection and preservation of strains of hemolytic streptococci recovered during the course of the epidemiological investigation of milk-borne outbreaks. This procedure permitted Stebbins to identify retrospectively by Griffith typing the specific strains of hemolytic streptococci encountered in certain earlier investigations.¹⁰ Since July, 1940, an attempt has been made to conduct this phase of the study immediately following the recovery of the presumptive causative organism. A tabular presentation of the studied epidemics is given in Table 3.

Griffith's Type 3 hemolytic streptococcus has been identified more frequently than any other single type, being encountered in three of the nine outbreaks investigated.

Each of the outbreaks enumerated

TABLE 3

*Milk-borne Outbreaks Due to Serologically Typed Hemolytic Streptococci
New York State, Exclusive of New York City*

| <i>Date</i> | <i>Place</i> | <i>Disease</i> | <i>No. of Cases</i> | <i>Griffith Type</i> | <i>Mode of Contamination of Milk</i> |
|-------------|------------------------------|--------------------|---------------------|----------------------|--------------------------------------|
| March, 1935 | Baldwinsville, Onondaga Co. | Septic sore throat | 500 | 27 | Infection of cow's udder |
| Jan., 1936 | Wellsville, Allegany Co. | Scarlet fever | 201 | 3 | " " " " |
| Dec., 1936 | Owego, Tioga Co. | Scarlet fever | 532 | 15-17 * | " " " " |
| July, 1940 | Waddington, St. Lawrence Co. | Septic sore throat | 48 | 19 † | Direct infection of milk (?) |
| Sept., 1940 | Kirkwood town, Broome Co. | Scarlet fever | 6 | not typable | Infection of cow's udder |
| Jan., 1941 | Pultney, Steuben Co. | Scarlet fever | 33 | 3 | " " " " |
| Nov., 1941 | Huntington Sta., Suffolk Co. | Septic sore throat | 116 | 11-12 * | " " " " |
| April, 1942 | Cannonsville, Delaware Co. | Scarlet fever | 44 | 3 | " " " " |
| April, 1942 | Coxsackie, Greene Co. | Septic sore throat | 200 | 2 | " " " " |

* Cross-typing

† Typing inconclusive but strongest agglutination with type 19 antiserum

provides interesting data relative to the epidemiological characteristics of milk-borne epidemics due to serologically typed hemolytic streptococci. The present report, however, will be limited to various phases of one of the more recent smaller outbreaks; namely, that which occurred in Cannonsville, Delaware County.

CANNONSVILLE OUTBREAK

During April, 1942, a small milk-borne outbreak of hemolytic streptococcus throat infections occurred in this relatively isolated rural community of approximately 275 inhabitants. It thus provided a unique opportunity to investigate the distribution of hemolytic streptococci among the general population. Moreover, the incriminated milk was found to have been secured from a large cheese plant handling milk from 356 producers, making the determination of the actual source of infection a distinct challenge.

Records of illness were obtained by house-to-house survey for 28 of 197 persons interviewed in Cannonsville and

for 16 of 42 individuals in the surrounding area. Thus the outbreak involved 44, or 18 per cent, of the 239 persons included in the study group. Seventy-seven per cent of the cases occurred in persons 15 years of age or over, and 61 per cent among males.

All of the cases occurred during the 3 week interval between April 5 and April 25. The dates of onset are shown graphically in Figure 1.

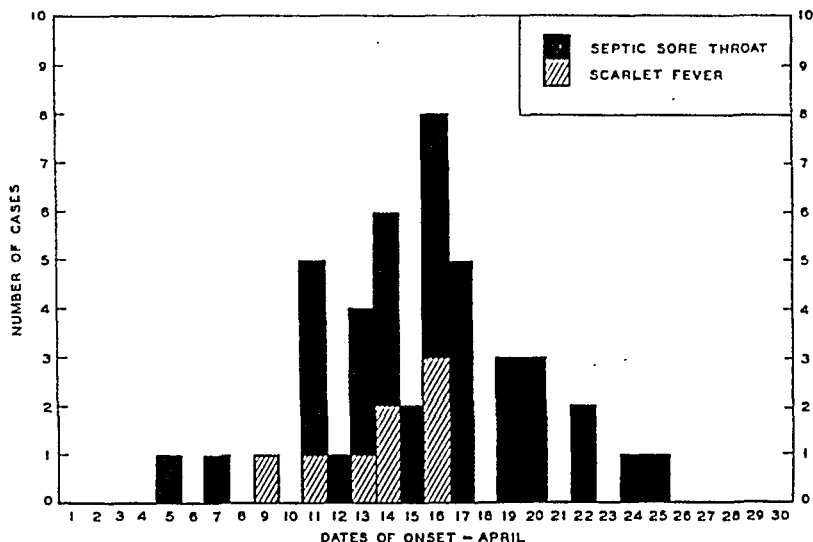
Thirty-seven of the 44 persons affected had first symptoms between April 11 and April 20, the peak daily incidence of 8 cases occurring on April 16.

CLINICAL CHARACTERISTICS

Illness was characterized by sudden onset of sore throat, fever (up to 103° F.), headache, cervical lymphadenopathy, and generalized arthralgia and myalgia. No deaths occurred among the 44 cases. In 8 instances, scarlatinal rashes were observed and, since the causative organism thus demonstrated its ability to elaborate erythrogenic toxin, this observation again indicates how illogical it is to distinguish between

FIGURE 1

DATES OF ONSET OF 44 CASES OF HEMOLYTIC STREPTOCOCCUS THROAT INFECTIONS
CANNONVILLE, DELAWARE COUNTY
APRIL, 1942



cases of septic sore throat and scarlet fever.

A striking characteristic of the outbreak was that of the joint manifestations experienced by 16 patients, or more than one-third of those ill. In some instances, only transient involvement of one or two joints with pain and limitation of motion was noted but in others severe polyarthritis was experienced with swelling, redness, and tenderness about the joints. In this category, 4 cases of migratory joint involvement clinically suggestive of active rheumatic fever were observed and the persons so affected experienced an asymptomatic period of 1 to 2 weeks between throat symptoms and these joint manifestations. One of the persons affected had previously experienced an acute attack of rheumatic fever.

Throat cultures were secured from 35 of the 44 cases either at the time of, or shortly after, the acute episodes of sore throat. Twenty-three of these yielded hemolytic streptococci, 17 of which were identified serologically as Lancefield Group A, 2 Group B, 3 Group D, and

1 could not be classified. Fifteen of the 17 Group A strains were established as belonging to Griffith's Type 3, thus indicating this organism to be the epidemic strain; the 2 remaining Group A strains proved refractory to typing.

INCRIMINATION OF MILK SUPPLY

At the outset of the investigation, it was apparent that the cases occurring in the outbreak were particularly concentrated among workers in the Q cheese plant. This plant, employing 30 workers, constituted the sole large commercial establishment in the area and, with the exception of dairy farming, constituted the principal source of livelihood of the residents of the community.

Milk used in Cannonville was found to be almost exclusively unpasteurized. Many families obtained milk from their own cows, a few purchased small quantities from three small dealers in the community, and the remainder of those using fluid milk secured their supply from the Q cheese plant. The majority of workers consumed milk while at work and were permitted to take milk

in their own containers for use at home. In addition, a few families residing in the immediate vicinity obtained their supply there although no members were actually employed in the plant. Table 4

SEARCH FOR SOURCE OF INFECTION
At the time of the investigation, the bulk of the milk was being utilized in the production of cheddar type cheese. Of the approximately 123,000 lbs. of

TABLE 4

Attack Rates among Consumers and Non-consumers of Milk from the Q Cheese Plant
According to Association with Plant

Outbreak of Hemolytic Streptococcus Throat Infections
Cannonsville, Delaware County, April, 1942

| Association with | Consumers Q Plant Milk | | Non-consumers Q Plant Milk | | Total | | Attack Rate Per cent | | |
|---------------------|------------------------------|-------|----------------------------------|-------|-------|-------|------------------------------|--------------------------------------|-------|
| | | | | | | | Consumers Q Plant Milk | Non- consumers Q Plant Milk | Total |
| | No. | Cases | No. | Cases | No. | Cases | | | |
| Cheese Plant | 25 | 15 | 5 | 2 | 30 | 17 | 60.0 | 40.0 | 56.7 |
| Plant workers | | | | | | | | | |
| Persons living in | | | | | | | | | |
| households of | | | | | | | | | |
| plant workers | 39 | 14 | 34 | 2 | 73 | 16 | 35.9 | 5.9 | 21.9 |
| Others | 19 | 9 | 117 | 2 | 136 | 11 | 47.4 | 1.7 | 8.1 |
| Total | 83 | 38 | 156 | 6 | 239 | 44 | 45.8 | 3.8 | 18.4 |

presents the attack rates experienced by consumers and non-consumers of milk from the Q plant according to the type of their association with this establishment.

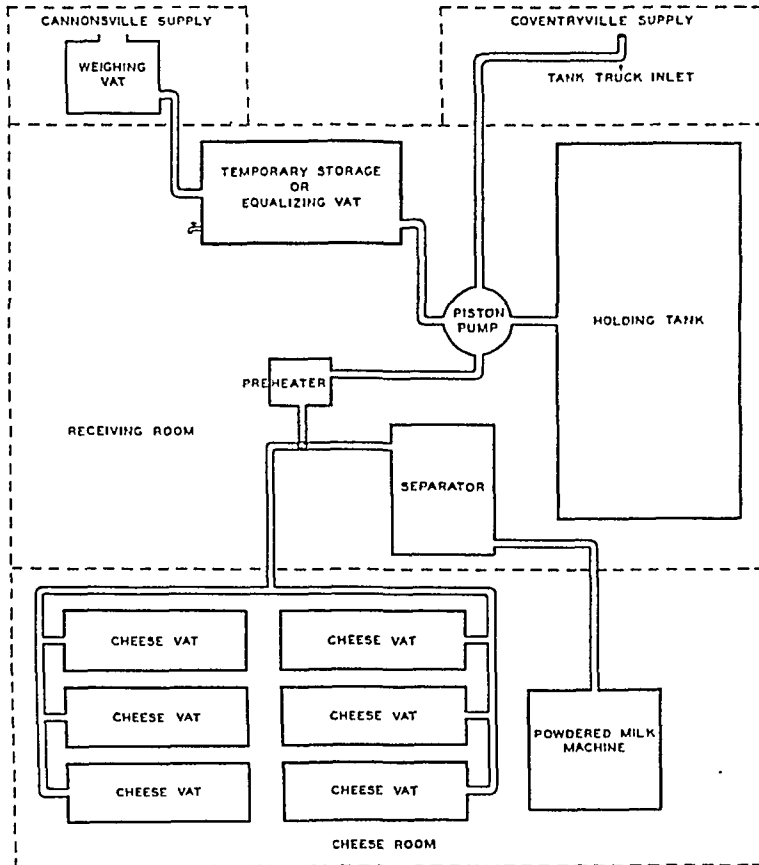
Regardless of consumption of milk from the plant, the workers experienced the highest frequency of illness, 56.7 per cent being affected. Almost 22 per cent of the household contacts of these workers also were ill but those in this group consuming milk from the plant experienced symptoms approximately six times more frequently than those denying use of this milk. Only 2 individuals, or 1.7 per cent, of those having no contact with the plant and denying use of milk from this source were ill. These 2 patients had onset late in the course of the outbreak, one on April 20, and the other on April 26, and it is believed represent either secondary cases or coincidental, sporadic, sore throats unassociated with the outbreak. The 9 cases occurring among users of the milk in households in which no member was employed at the plant afford further confirmation of the hypothesis that infection was transmitted by the milk.

milk handled daily in the plant, 48,000 were received from local dairymen in 40 qt. cans and 75,000 were brought to the plant by tank truck from a receiving station in Coventryville, some thirty-five miles distant. The local product was poured into the weighing vat and flowed by gravity to a temporary storage or equalizing vat (Figure 2). The bulk of this was usually used immediately by pumping through a preheater to a separator or to the cheese-making vats.

The Coventryville supply was pumped directly from the tank trucks to the holding tank and from there to the preheater and separator or to the cheese vats.

The employees drinking milk at the plant did so in the cheese room. A common dipper was used and the milk was taken either from a pipe coming from the storage tanks or directly from the cheese vats. Milk to be used outside the plant was obtained from an outlet from the temporary storage vat in the receiving part of the plant. Since the use of this milk was known to have resulted in illness and it came from that part of the plant where contamination

FIGURE 2
SCHEMATIC DIAGRAM
Q CHEESE PLANT
CANNONVILLE, DELAWARE COUNTY



from a human source was least likely to occur, the source of infection of the milk appeared to exist prior to receipt of the milk at the plant. Moreover, since the Coventryville tank truck supply only rarely was introduced into the temporary storage vat, suspicion was directed chiefly toward the local supply reaching the plant in 40 qt. cans.

The 123,000 lbs. of milk brought to the plant daily were supplied by 356 producers and represented the output of 6,069 cows. Although the epidemiological evidence suggested that the source of infection of the milk probably existed on one of the 116 farms contributing to the supply brought directly to Cannonsville, a systematic examination was made of each of the 2,029 cans

of milk received at both of the depots. A Breed smear examination was made of samples of each of these cans. On the basis of the presence of chained streptococci or excessive numbers of leucocytes (an estimated 500,000 or more leucocytes per ml.), 73 of the 356 herds were selected for further study. Each of these 73 producing farms was subsequently visited and, in addition to careful examination of each cow in these herds, information was obtained with respect to history of teat injury among the cows, or illness or superficial infections among residents of the farm. Whenever histories of teat injury were obtained or evidence of bovine mastitis was discovered, samples of milk were taken for bacteriological examination.

A total of 150 such quarter samples of milk from cows in 55 herds were examined and from 17, or 11.3 per cent, beta hemolytic streptococci were isolated. Each of these strains was identified serologically: one was found to be Lancefield Group A, 8 Group B, and a similar number Group C. The Group A organism was further identified as Griffith Type 3, identical with the strain previously demonstrated as the cause of the outbreak.

The milk containing the Type 3 hemolytic streptococci came from a cow on a farm sending its milk directly to Cannonsville. The cow had had its right hind teat stepped on and crushed some time in late February or early March, approximately 6 weeks prior to the beginning of the outbreak. The resultant injury had been treated by the son of the owner of this particular farm, and a teat dilator and milk tube had been used repeatedly in an effort to maintain this animal in the milking line. At the time of the veterinary examination on April 23, a severe, acute mastitis was found to involve the affected quarter.

Nineteen other cows in the herd were found to be normal, and 1 proved to be suffering from a benign mastitis due to an organism other than beta hemolytic streptococcus.

Histories of recent illness were obtained from 3 of 7 members of this household including the boy who had cared for the cow's injured udder. The first person affected was the mother, who experienced a severe attack of so-called "grippe" in late March. Shortly thereafter the 14 year old daughter developed scarlet fever. The son next developed a severe sore throat with fever and swollen glands in the neck. He was sufficiently ill to spend several days in bed and to consult a physician. The dates of onset in the mother and daughter definitely preceded the outbreak. It seemed impossible to ascertain definitely the date of onset in the boy,

but he sought medical care about April 18, and he had been suffering for some time before that. It appears likely, therefore, that his onset also antedated the outbreak, and in view of his caring for the incriminated cow he seems the most probable source of the cow's infection.

Repeated throat cultures were taken from this boy's throat, and were consistently negative for hemolytic streptococci; however, the first culture was taken approximately 2 weeks after cessation of his acute symptoms. Group A beta hemolytic streptococci were isolated from the throats of both of the other persons on the farm who were ill, and upon typing were found to be Type 3.

THROAT CULTURE SURVEYS

We were curious as to the prevalence of the Type 3 hemolytic streptococcus in the community, and as to the extent to which it might be disseminated subsequently through the population. Accordingly, at the time of, and again at approximately 1 and 2 months after the outbreak, throat cultures were obtained from a large sample of the population. Persons cultured included workers in the Q plant, non-employees who consumed milk from this source, and individuals having no contact of any sort with the plant. The bacteriological findings of these surveys are presented in Table 5, and shown graphically in Figure 3.

In the first survey, at the time of the outbreak, 30 of the cases occurring among consumers of milk from the Q plant were cultured and 15, or 50 per cent, were positive for the Type 3 hemolytic streptococcus. Of 33 additional consumers of Q milk who did not become ill, 2, or 6.1 per cent, were found to be carriers of a Type 3 organism, whereas none of the 104 members of the general population who denied the use of Q milk were found to

TABLE 5
Results of Throat Culture Surveys
Outbreak of Hemolytic Streptococcus Throat Infections
Cannonsville, Delaware County, April, 1942

| First Survey (April 20-21) | | | | | | |
|----------------------------|-----------|-------|----------------------|-----------|-------|------|
| Drank Q Milk | | | Did Not Drink Q Milk | | | |
| Cases | Not Cases | Total | Cases | Not Cases | Total | |
| 30 | 33 | 63 | 5 | 99 | 104 | |
| Number Cultured | | | | | | |
| Number Positive | | | | | | |
| Hemolytic Streptococci | 22 | 13 | 35 | 1 | 26 | 27 |
| Group A | 17 | 2 | 19 | .... | 6 | 6 |
| Type 3 | 15 | 2 | 17 | .... | .... | .... |
| Other than Group A | 5 | 11 | 16 | 1 | 20 | 21 |
| Per cent Positive | | | | | | |
| Hemolytic Streptococci | 73.3 | 39.4 | 55.6 | 20.0 | 26.3 | 26.0 |
| Group A | 56.7 | 6.1 | 30.2 | .... | 6.1 | 5.8 |
| Type 3 | 50.0 | 6.1 | 27.0 | .... | .... | .... |
| Second Survey (May 19) | | | | | | |
| Drank Q Milk | | | Did Not Drink Q Milk | | | |
| Cases | Not Cases | Total | Cases | Not Cases | Total | |
| 21 | 32 | 53 | 6 | 91 | 97 | |
| Number Cultured | | | | | | |
| Number Positive | | | | | | |
| Hemolytic Streptococci | 14 | 14 | 28 | 1 | 32 | 33 |
| Group A | 8 | 2 | 10 | .... | 7 | 7 |
| Type 3 | 5 | .... | 5 | .... | .... | .... |
| Other than Group A | 6 | 12 | 18 | 1 | 25 | 26 |
| Per cent Positive | | | | | | |
| Hemolytic Streptococci | 66.7 | 43.8 | 52.8 | 16.7 | 35.2 | 34.0 |
| Group A | 38.1 | 6.3 | 18.9 | .... | 7.7 | 7.2 |
| Type 3 | 23.8 | .... | 9.4 | .... | .... | .... |
| Third Survey (June 30) | | | | | | |
| Drank Q Milk | | | Did Not Drink Q Milk | | | |
| Cases | Not Cases | Total | Cases | Not Cases | Total | |
| 12 | 27 | 39 | 5 | 89 | 94 | |
| Number Cultured | | | | | | |
| Number Positive | | | | | | |
| Hemolytic Streptococci | 4 | 9 | 13 | .... | 27 | 27 |
| Group A | 1 | 1 | 2 | .... | 4 | 4 |
| Type 3 | .... | .... | .... | .... | .... | .... |
| Other than Group A | 3 | 8 | 11 | .... | 23 | 23 |
| Per cent Positive | | | | | | |
| Hemolytic Streptococci | 33.3 | 33.3 | 33.3 | .... | 30.3 | 28.7 |
| Group A | 8.3 | 3.7 | 5.1 | .... | 4.5 | 4.3 |
| Type 3 | .... | .... | .... | .... | .... | .... |

harbor Type 3 streptococci. At the time of the second survey on May 19, the percentage of cases among Q milk consumers who still harbored the Type 3 organism had dropped to 23.8 per cent. None of the other consumers of Q milk were found to carry the Type 3 streptococcus, and again no Type 3 carrier was found among the general population denying use of Q milk. At the time of the third survey on June 30, no Type 3 streptococcus was encountered, and all three groups were essentially uniform as to the percentage of hemolytic streptococci isolated, and the

percentage of these in turn which were of Group A.

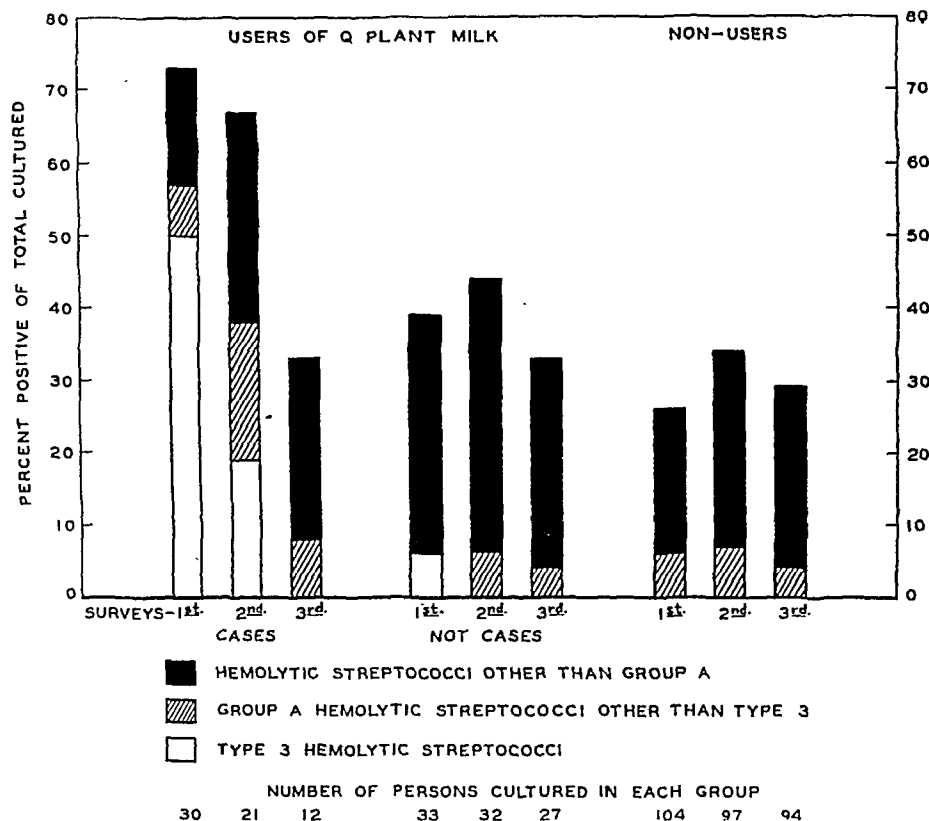
It is of interest that the frequency of nasopharyngeal carriers of all hemolytic streptococci and of Group A strains as well in the population unexposed to the Q milk remained relatively constant throughout the three surveys.

CONTROL MEASURES

As soon as preliminary evidence suggested that the milk used at or taken from the plant was the probable vehicle of infection (April 17), the distribution of this milk for drinking purposes was

FIGURE 3

THROAT CULTURE SURVEYS
HEMOLYTIC STREPTOCOCCUS THROAT INFECTIONS
CANNONVILLE, DELAWARE COUNTY



discontinued. On April 23, the cow ultimately incriminated was segregated and its milk discarded. On April 28, results of typing the hemolytic streptococcus isolated from samples of milk from this cow were available and indicated that it was the cow probably responsible for the outbreak. It was slaughtered on May 8. When udder tissue obtained at autopsy was submitted for bacteriological examination, Type 3 organisms were again recovered.

As previously stated, the principal product of the Q plant was cheddar type cheese and it was known that this cheese was being purchased by a large dealer for possible shipment to England. All cheese processed and stored in the plant between April 5, the date of last shipment, and April 22, when pasteurization of milk was begun, was embar-

goed. Samples were taken from cheese processed on each day during the interval and although large numbers of beta hemolytic streptococci were readily recovered from them, none of the many strains studied proved to be members of Lancefield's Group A. Because it was impossible, nevertheless, to state that strains of hemolytic streptococci pathogenic for man were not present in the cheese, it was treated by a process in which it was heated to a temperature of over 170° F. for several minutes, insuring destruction of any pathogenic microorganisms which might be present.

SUMMARY

An attempt has been made to determine the Griffith type of hemolytic streptococci isolated in nine milk-borne outbreaks of hemolytic streptococcus

throat infections in New York State from 1935 to 1942. A different type has been encountered in each outbreak with the exception of three outbreaks due to Type 3.

The epidemiological study of a recent outbreak of 44 cases of Type 3 hemolytic streptococcus throat infection occurring in a small rural community is described in detail. The infection was found to be transmitted by raw milk secured at a local cheese plant.

Although the cheese plant handled milk representing the output of 6,069 cows, it is believed that the cow responsible for the outbreak was located by means of Breed smear examination of cans of milk received at the plant, and subsequent veterinary and bacteriological follow-up of suspected herds.

On the involved farm it was found that prior to the outbreak there had been one case each of scarlet fever, sore throat, and so-called "grippe." The suspected cow had suffered a teat injury, followed by development of acute mastitis upon manipulation of the injured part by the person with the sore throat. Hemolytic streptococci obtained from the throats of people on the farm and from udder tissue secured from the cow at autopsy also were found to be Type 3.

Three throat culture surveys were made in the community, the first at the time of the outbreak, the second a month later, and the third approximately two months after the outbreak.

In the first survey, Type 3 hemolytic streptococci were found only in throats of consumers of milk from the incriminated cheese plant. The per cent infected with this type was less in the second survey, and in the third survey

no Type 3 hemolytic streptococcus was isolated.

To prevent any possibility of transmission of the infection through the cheese, that produced during the outbreak period was embargoed and released only after being reprocessed by a method involving heating the product above 170° F. for several minutes.

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Changes in the Bacterial Cell Brought about by the Action of Germicides and Antibacterial Substances as Demonstrated by the Electron Microscope*

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THE electron microscope is giving us new insight into fine structure in a great variety of fields. In bacteriology it is yielding an altogether clearer picture of the normal morphology of the bacterial cell. The present paper is submitted as evidence that the electron microscope is capable also of revealing structural changes brought about by antibacterial agents, and thus contributing to an understanding of the mechanism of action of such agents. Three special cases will be cited: (1) the action of simple salts of heavy metals, (2) the action of flagellar and somatic agglutinins on *Eberthella typhosa*, (3) the pneumococcal capsular swelling reaction.

Electron pictures of bacteria after brief exposure to salts of silver, lead, mercury and nickel have shown the bacterial inner protoplasm, but not the cell-walls, to be selectively darkened; shrinkage, coagulation, or escape of protoplasm from the injured cells may result and be recorded in the electron micrographs.¹ To what extent more complex chemical germicides and antibiotic substances will produce struc-

tural changes which can be recorded by electron micrography is a question for future investigation.

Electron pictures have been taken of cells of *Eberthella typhosa* exposed to homologous rabbit antiserum.^{2, 3} Specific combination with flagellar and somatic antibodies results in the formation of antibody films on the surfaces of the bacterial flagella and cell walls. The thickness of these films may increase with time of exposure to antiserum and with concentration of antiserum. Measurement of the thickness of the films deposited under various conditions are compatible with their interpretation as monomolecular films in which an ellipsoidal antibody-molecule^{4, 5} is oriented with its long axis either approximately parallel to or approximately perpendicular to the plane of the antigenic surface, depending upon concentration and other experimental conditions; however, the alternative possibility that the observed change in thickness of deposited film with antibody concentration may be due to secondary adsorption of nonspecific protein from the antiserum upon the primary antigen-antibody complex, has not thus far been excluded.

Electron micrographs of the capsular swelling of pneumococci after exposure

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

to homologous rabbit antiserum⁶ reveal a phenomenon quite different from those cited above. The increase of the capsule in thickness amounts to 2,000 Å or more, or many times the long diameter of the globulin molecule. The polysaccharide of the pneumococcal capsule is described as composed of thread-like molecules.⁷ The electron pictures are compatible with the interpretation that these molecules form a gel into whose interstices the antiserum molecules penetrate; the capsule increases in size and density in consequence of this impregnation.

The electron micrographs were taken by Dr. T. F. Anderson at the RCA Research Laboratories at Camden, N. J., and by F. Heinmetz at the Johnson Foundation for Medical Physics, the University of Pennsylvania.

SUMMARY

The electron microscope has revealed structural changes in bacteria dependent upon, (a) penetration of heavy metal ions or molecules into the bacterial cell and interaction with the inner bacterial protoplasm; (b) the formation of

surface films of antibody upon bacterial flagella and cell-walls; the thickness of these films is compatible with their being monomolecular, but this need not necessarily be the correct interpretation; (c) the impregnation of a capsule outside the bacterial cell-wall, a great increase in size and density resulting. The electron microscope is thus shown to be a new analytical tool for investigating the mode of action of at least some germicidal and antibacterial substances.

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1943 Victory Book Campaign

The 1943 Victory Book Campaign is under way and will continue until March 5. The slogan in this year's drive for books for the armed forces is "Any book you really want to keep is a good one to give." Fiction, adventure, western and detective stories are asked for and technical books published since

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Epidemiological and Experimental Observations on the Possible Significance of Rodents in a Suburban Epidemic of Poliomyelitis*

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IT is the purpose of this communication to record briefly preliminary observations bearing (a) on the recovery of a rodent-paralyzing virus from house mice collected in an endemic area of human poliomyelitis, and (b) on the apparent transfer of poliomyelitis virus to rodents from one of the human cases involved in this epidemic. Since the two sets of observations were made in the course of the same epidemic and the results serve to supplement each other, the pertinent data are here reported together.

I. RECOVERY OF A RODENT-PARALYZING VIRUS FROM HOUSE MICE IN ASSOCIATION WITH A LOCALIZED OUTBREAK OF HUMAN POLIOMYELITIS

Within a sharply circumscribed half square mile area in White Plains, Westchester County, N. Y., bounded by the Bronx River and a tributary brook, 5 cases of poliomyelitis occurred in the fall of 1942. The cases followed each other in rapid sequence between the

end of September and the beginning of October. They were the only cases of this disease reported in the entire city for the current year, though 2 cases of poliomyelitis had been reported in this locality during the previous year. The epidemic involved 2 adults and 3 children, all of whom were treated at the Grasslands Hospital, Valhalla, N. Y. Two patients died of bulbar paralysis and 3 recovered with extensive peripheral paralyses. Post-mortem examination of both fatal cases revealed severe and typical lesions in the cord and medulla.

In searching for a possible extra-human local source of contagion among rodents, a dead gray house mouse was discovered in the basement of the home of one of the fatal cases (M.M.), shortly after the patient's admission to the hospital; the animal had obviously been dead for only a short time. A second gray house mouse was trapped in this basement on the same day. Additional house mice, dead or alive, were later collected in other parts of the epidemic area. The brains of all mice were removed and, after storage in

* Aided by grants from the Philip Hanson Hiss, Jr. Memorial Fund, the Warner Institute for Therapeutic Research and anonymous donors.

glycerin for a few days, failed to cause any growth upon inoculation of ordinary bacteriological media. Saline suspensions (10 per cent) were prepared from these mouse brains and injected intracerebrally into albino mice. Definite symptoms were observed in some albino mice following injection with brain material from 3 different house mice, *i.e.*, the dead mouse and the trapped mouse found in the home in which one of the fatal cases had occurred (M.M.), and another house mouse trapped in the neighborhood.

The symptoms appeared after an incubation period of from 5 to 14 days and were characterized by ruffled fur, excitement, strong tremors, nervous movements of the forepaws, and occasional convulsions with respiratory failure. In some mice these initial symptoms progressed to paresis of both front and hind legs and terminated in death; in others, the symptoms were of a transitory character and the animals recovered. This syndrome was further transmissible in albino mice by intracerebral but not by intraperitoneal transfer of 10 per cent brain and cord suspensions from the affected mice.

While all lines of transmission originating from trapped healthy house mice came to an abrupt end after one or two laboratory passages, transmission of the infectious agent recovered from the dead house mouse has been maintained, so far, over twelve serial passages in albino mice. During the early passages the ratio between symptomless survival, convalescence, or death varied greatly from generation to generation. With subsequent passages the incubation period shortened and the described nervous symptoms became more pronounced, resulting in death of most of the injected animals and frequently in complete flaccid paralysis of one or more extremities. With later passages, mice could also be infected by the intraperitoneal route. Intra-

cerebral injection of passage-mouse brains into rabbits, guinea pigs, or rhesus monkeys failed to produce any symptoms; however, transfer to one cotton rat and two hamsters succeeded with the third and ninth mouse brain passage, respectively, leading to prostrating paralysis in the injected rodents. Sterility tests of several mouse passage brains showed them to be free from microorganisms cultivable on ordinary bacteriological media. On the other hand, the infectious agent passed easily through a Seitz filter.

Neutralization tests were carried out with later mouse brain passages by injecting young albino mice intracerebrally with mixtures of 10 per cent virus suspensions and various sera. The results of repeated tests indicated that the serum from 2 of the 3 convalescent patients neutralized virus to an appreciable extent (90 per cent survival among the injected mice), whereas neutralization was less marked with the serum from one of these patients collected during the early stages of the disease (60 per cent survival). Definite neutralization was also obtained with normal adult mouse serum (90 per cent survival), but not with normal rabbit serum (45 per cent survival). Pathological examination of mice which presented the fully developed paralytic disease showed extensive destruction of the anterior horns in various levels of the spinal cord, recalling the picture of "rodent poliomyelitis." In other words, the lesions were generally similar to those observed in mice suffering from Theiler's disease,¹ or in mice paralyzed by infection with either the mouse-adapted Lansing,² or the SK³ murine strains of human poliomyelitis virus.

The exact nature of this virus is not known at present. In view of its relatively low pathogenicity for albino mice, it has not been possible accurately to titrate potency, determine limits of

filterability, study various routes of invasion, investigate the range of susceptible hosts, or carry out more extensive neutralization tests. However, the filterability of the infectious agent, together with the symptomatology and pathology of the disease which it produces in albino mice, may be taken as suggestive evidence that we are dealing with a virus of the poliomyelitis group, perhaps identical with or related to the FA strain of Theiler's virus of "spontaneous mouse encephalomyelitis."⁴ This conclusion would be strengthened by the fact that a small group of mice which had survived this virus infection resisted intraperitoneal reinfection with a standard strain (GD VII) of Theiler's virus, whereas normal control mice developed paralysis. It should be noted, however, in this connection that heretofore Theiler's virus has not been encountered in healthy gray house or field mice (brain or intestines) trapped at a distance from the laboratory.⁵ Final identification of the described infectious agent and the relationship, if any, which may exist between its local carriage by house mice and the synchronous outbreak of human poliomyelitis are problems which are at present under investigation.

II. ISOLATION OF A RODENT-PARALYZING VIRUS BY PASSAGE OF HUMAN POLIOMYELITIS VIRUS TO SYRIAN HAMSTERS, EASTERN COTTON RATS AND ALBINO MICE

Attempts to corroborate the clinical and pathological diagnosis of poliomyelitis in the 2 fatal cases referred to above were made by tests in rhesus monkeys. Intracerebral injection of a monkey with brain and cord material from one of the fatal cases (T.D.) failed to produce any symptoms. However, prostrating paralysis, with typical cord lesions, occurred in another monkey following intracerebral injection with a suspension from cord and medulla of

the second fatal case (M.M.). Intracerebral transfer of this monkey cord to another monkey failed to transmit paralysis but caused death in a hamster on the 20th day after injection. At the same time the original human material was also injected intracerebrally into other laboratory animals, i.e., 1 rabbit, 3 guinea pigs, 19 albino mice, 2 cotton rats, and 1 hamster. None of the injected animals showed any definite signs of disease, except for the hamster, which appeared sick on the 18th day after injection and was found dead the next morning. Intracerebral transfer of this hamster's brain to another hamster caused in the latter animal complete flaccid paralysis of both hind legs within 5 days. Further intracerebral passage of the paralyzed hamster's brain to 2 new hamsters, 2 cotton rats, 5 albino mice, 1 rabbit, and 1 rhesus monkey was followed by prostrating paralysis, within 2 to 3 days, in all injected small rodents. The monkey developed a transient fever but remained free from recognizable paralysis; no symptoms were observed in the rabbit. From this point it was possible to transmit the disease serially through passages of hamsters and mice, using both intracerebral and intraperitoneal routes of injection.

The infectious agent proved filterable through Seitz filters; it passed readily through graded collodion membranes of 50 mu APD and with considerable difficulty through membranes of 26 mu APD, but was completely retained by membranes of 10 mu APD. The probable size of the virus particle may therefore be assumed to lie in the neighborhood of 10 mu. Of special interest is the enormous potency and invasiveness of this virus. In both intracerebral and intraperitoneal tests dilutions between 10^{-3} and 10^{-5} were capable of inducing paralysis in hamsters, while dilutions as high as 10^{-11} sufficed to paralyze albino mice, by either intracerebral or intra-

peritoneal injection, within an incubation period of from 24 hours to 5 days.

Pathological examination of paralyzed hamsters and albino mice revealed the presence of typical and severe poliomyelitic lesions in the entire central nervous system. Neutralization tests were carried out by injecting albino mice intraperitoneally with mixtures of mouse passage virus and various sera. The results of repeated tests may be summarized as follows: A high degree of virus neutralization was obtained with a rabbit antiserum against Theiler's virus (1 million paralytic doses) and with a rabbit antiserum against SK murine virus (10,000 paralytic doses)⁶; a moderate or slight degree of virus neutralization occurred with an antipoliomyelitis (monkey virus) hyperimmune horse serum (100 paralytic doses) and with three convalescent sera collected from surviving patients in this epidemic (10 paralytic doses). Control sera which failed to neutralize the virus at the indicated levels were normal horse, rabbit, and hamster serum.

From what has been said before, it is clear that the cord and medulla of the fatal case (M.M.), upon direct inoculation, was capable of causing paralysis in one rhesus monkey only. It also appears that the human material was primarily non-pathogenic for cotton rats and albino mice, but that intermediary hamster passage had evidently brought about some change in the virus which made it possible subsequently to maintain multiple paralytic passages in several species of rodents, including hamsters, cotton rats, and albino mice.

The above facts, while suggesting that a direct transfer of poliomyelitis virus was obtained from man to hamster—with further transfer from hamster to cotton rats and white mice—are ad-

mittedly insufficient actually to prove such transmission. The possibility that accidental contamination may have occurred with a latent virus, or with a virus carried in the laboratory, cannot be ignored. However, the circumstances under which these observations were made and the trend of the available data would tend to minimize the chances for such a contamination. It is hoped that further work, which is in progress, will help to clarify not only this problem but make it possible to pass final judgment on the identity or non-identity of the two paralyzing viruses isolated from man and mouse in the course of this epidemic.

CONCLUSIONS

A rodent-pathogenic virus which paralyzes albino mice, cotton rats, and hamsters was isolated from the brain of a house mouse found dead in the home of a fatal case of human poliomyelitis. Another rodent-pathogenic virus capable of inducing paralysis in albino mice, cotton rats, and hamsters was isolated from the brain stem of this fatal case. The two viruses, when passaged in albino mice, are similar in that both are completely inactivated by antisera against Theiler's virus of mouse encephalomyelitis and show some neutralization with convalescent sera from patients involved in this epidemic. They differ however markedly in virulence for albino mice in that the human virus is much more potent than the mouse virus.

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GENITOINFECTIONOUS DISEASE AND EMPLOYMENT

THE above heading is the title of an article which appeared in the October, 1942, issue of the *Bulletin of Genitoinfectious Diseases*, published by The Massachusetts Society for Social Hygiene, Inc. The author is Dr. N. A. Nelson, of The Johns Hopkins University, School of Hygiene and Public Health.

The attention of *Journal* readers is earnestly called to this paper, for here Dr. Nelson attempts to bring a modicum of order out of the confusion of measures instituted in one direction or another, by one agency or another, for the control of venereal diseases. He throws into startling relief the fact that we have made somewhat of an unholy hash of such measures, in that persons with positive sera and no other evidence of syphilis, are in many instances assumed to be in a communicable stage, and on this basis it is common practice to exclude them from employment.

To undertake further to paraphrase and condense the article in question would be unwise, for to get its full savor one must read it as a whole. However, two passages will give an idea of the incisiveness of Dr. Nelson's thinking, and, it is hoped, will encourage *Journal* readers to go back to the original. The author says:

"It has been easy to persuade industry to do blood testing because industry thought it could see something of advantage to itself in the procedure. The health department wanted to find infection and treat it, but instead of saying so, it has sold the idea to industry as a measure for the protection of industry. It has dwelt so long and loudly upon the dangers of genitoinfectious disease that employers have concluded that the only safe way out is to exclude the infected from employment altogether.

"There is no relationship whatever between the positivity or negativity of a blood test and the infectiousness of syphilis. A person with an early primary lesion, or one with an inadequately treated and potentially infectious early syphilis, may have a negative test. The majority of detectable infections to be found in any community, at any given time, are non-communicable by virtue of their age, or as the result of treatment; yet most of them will produce positive tests. Thus, the argument that a positive test should serve to exclude a person from employment, because syphilis is a communicable disease, is fallacious."

Copies of the publication in which Dr. Nelson's article appears may be obtained from the Massachusetts Department of Public Health, Room 545, State

House, Boston. We are glad to act as publicity agent in this instance, for only through such approaches as this sane one of Dr. Nelson's shall we be able to disentangle some of the knots that have been tied by emotion, wishful thinking, and opportunism.

A SOUR OBSERVATION ON THE LANHAM ACT

FEDERAL legislation relating to the public health moves somewhat fast and confusingly in these days of stress and change. As to that bit of it known as the Lanham Act, we find that we must keep our editorial fingers crossed. The Act provides that federal grants may be made for the purpose of increasing or providing public works in those areas where, because of war activities, similar existing facilities are inadequate. Undoubtedly, many localities will be benefited through this Act and, from a broad national standpoint, it is quite logical and only fair that the federal government bear a part of the financial burden carried in various localities when that burden is heavy because of national interests and activities. There is, however, in this Act a disquieting feature in so far as federal public health administration is concerned. Thus, though the intent of the Act in its relation to health is stated specifically to be the provision of facilities and public works (water and sewerage system, garbage disposal, recreational facilities, hospitals, etc.), there seems danger that the operation of a local public health service, voluntary or official, may be interpreted as coming within the definition of "public works." It is to be hoped, and sincerely hoped, that those responsible for the administration of the public health aspects of the Act will not go seriously into the business of subsidizing health services. The need for public health facilities in the areas in question is sufficient to absorb all the funds available and, in the provision of such facilities, the administrators of the Lanham Act have the ample experience of the Work Projects Administration upon which to draw. They do not know, nor are they now likely to be able to employ persons who know, either the relative seriousness of public health problems or the comparative values of local public health practices. Further, for the Lanham Act administrators to enter into subsidy of local health services would put into this field still another national administrative unit with money to spend and terms to lay down. The situation is confused enough as it is, but to introduce into it a new federal group which would deal with the thousands of local health agencies in the United States, is likely to create far more chaos than benefits.

Many will have forgotten that we went through a somewhat similar mushroom growth of federal health agencies in World War I. The situation became so distressing that Mr. Wilson finally put an end to it by a Presidential order, placing under the U. S. Public Health Service all federal public health activities except in relation to the Army and Navy. It is, of course, too much to hope that Mr. McNutt would be willing to put all the Federal Security Agency's health activities under the Service, or that the President might on a major scale similarly pull together the public health activities scattered throughout the federal government.

It is not a bad idea, at that.

BOOKS AND REPORTS

Introduction to Parasitology—By A. S. Pearse. *Baltimore: Thomas*, 1942. 357 pp. Price, \$3.75.

In the preface, the author of this book states that it is intended primarily for college students. This book, therefore, represents no major contribution to the excellent texts already available on the subject of medical parasitology. With this in mind one cannot be too critical of deficiencies in the text, namely, in relation to the handling of the clinical and therapeutic aspects of human parasitic diseases. On the whole, it is felt that for medical students, public health men, and practitioners, this book is not to be recommended as a practical text or source book on the subjects of diseases produced by animal parasites. It would seem worth while if one were getting a text, to invest the extra few dollars if necessary and obtain one of the more recent books especially written for medical men.

For college students, the material in Pearse's text seems well presented and profusely illustrated by fairly good drawings.

HARRY MOST

A Venture in Public Health Integration—*The 1941 Health Educational Conference of the New York Academy of Medicine. New York: Columbia University Press*, 1942. 56 pp. Price, \$1.00.

Because this brief book needs so badly to be read by public health administrators and by everyone among us who is in a position of power or trust, the words "health education," I suspect, were purposely omitted from the name given to these transactions. Whether or not that is the reason for choosing the provocative wording of the

title, this is no manual, handbook, or working guide for health educators. Instead it is a statesmanlike discussion of the rôles of the practising physician, the voluntary agency staff member, and the public health official in an integrated plan of adult health education.

First to be considered, is the growing significance of geriatrics in public hygiene and, with it, the opportunity and the duty of practising physicians to improve the health of the aged through lifetime personalized guidance.

After a merciless dissection of most of the faults of our present-day hodge-podge of educational effort, the second part proposes a nationally planned attack to orient objectives, to formulate state and community programs, and to direct research in content and method.

Certainly one of the most stimulating definitions of health education thus far propounded introduces the last part of the discussion. Though it is almost two pages long, when it is ended, the whole problem stands out sharp and clear before a background of fact. Whoever the belted and spurred officers may be, the slogging, sweating infantry in this war against ignorance is the local health department. It alone can fit teaching to need, can reach those whose necessity is greatest, can make education work.

Yes, every one of us needs badly to read this book.

RAYMOND S. PATTERSON

Get More Out of Life—How Troubled People Can Find Help—By Catherine Groves. *Introduction by Dr. Howard W. Odum. New York: Association Press*, 1941. 136 pp. Price, \$1.25.

Counsellors as well as persons in need

of counsel will be helped by reading this interpretation of one of the most recent and least understood fields of social service.

Out of a background of training and practical experience, the author interprets clearly and concisely why people can be helped by discussing personal problems with someone who may be able to get a perspective and who is neither a friend nor a relative. Practical illustrations are skillfully used to clarify various problems in human relationships which may arise.

Emphasis is placed upon the need of professional skill in counselling, although backgrounds of training may vary. Physicians, psychiatrists, educators, clergymen, social workers, and nurses all have opportunities for helping persons in trouble. They will find it worth while to read this excellent analysis of how to help people to help themselves.

Stress is placed upon the limitations of the counselling field. A good counsellor knows when other skills are needed and does not hesitate to refer clients to a specialist when indicated.

A section of the book deals with the danger of charlatanism and advises persons in trouble how to find the service needed.

VALERIA HOPKINS PARKER

The Amateur Scientist. Science as a Hobby (*Two Appendices*)—By W. Stephen Thomas. New York: Norton, 1942. 291 pp. Price, \$3.00.

As pointed out in the Foreword, Benjamin Franklin, who founded the American Philosophical Society in 1780, was one of the greatest of amateur scientists, and Philadelphia, in which he spent much of his life, has been noted for the cultivation of science among amateurs. It is fitting therefore that the society which he founded and which has its home in Philadelphia should sponsor a Committee on Educa-

tion and Participation in Science. The present book is based largely on the researches and findings of that committee, and the writer, secretary of the committee for three years, was Director of Education at the Academy of Natural Sciences, so that no better atmosphere could have been found for such a work.

The book begins with a study of the characteristics of amateur scientists in general and their motives for taking up as a hobby some branch of science, which, as the book shows, vary from the practical to the abstruse. Among amateur scientists, many of whom have made notable contributions, can be found all classes, from professional men in law and medicine, to brick masons, postmen, printers, office workers, etc. An Appendix gives the occupations of 727 men and women in the Philadelphia area who are interested in science as amateurs. These people represent 134 occupations classed under five headings, Professional; Business; Skilled and Semiskilled, Technical and Nontechnical; Service; and Miscellaneous. There are detailed studies of four sample subjects in which some 500 amateur scientists have taken part: Blooming Dates of Plants, Climatology and Tree Rings, Radio Ionosphere, and Report on the Project in Zoölogy.

The fact that a body such as the American Philosophical Society has considered it worth while to investigate the subject under a committee chosen for the special aptitude of its members insures us that the estimate of the importance and value of the amateur scientists is fully justified. Indeed the project was proposed by the President of the Carnegie Corporation, and the offer made to supply financial support for the study of adult education in science in the Philadelphia area if the Philosophical Society would undertake it. Another very great advantage is to the amateur scientists themselves,

strikingly expressed as early as 1859, by Charles Kingsley, who wrote:

"I have known, again and again, working men, who in the midst of smoky cities, have kept their bodies, their minds, and their hearts healthy and pure by going out into the country at odd hours and making collections of plants, fossils, insects, birds, or some other objects in natural history."

A wide range of readers will find this book of interest and value. The printing and make-up are excellent and the illustrations are largely reproductions of photographs showing direct from life features of the studies which were made.

MAZÛCK P. RAVENEL

Tables of Food Values—By Alice V. Bradley. (rev. ed.) Peoria, Ill.: Manual Arts Press, 1942. 224 pp. Price, \$3.50.

The revised edition of *Tables of Food Values* presents conveniently arranged data on composition of foods as eaten. Some such handbook is a "must" for any public health worker who has occasion to plan or evaluate diets on the basis of the daily allowances for specific nutrients recommended by the Committee on Foods and Nutrition of the National Research Council.

The nutritive values of a very large number of foods, raw, cooked, and combined in dishes, are given in two complete sets of tables. The tables in Part I, intended for rough estimation of the nutritive value of individual foods and typical diets, give values for average servings. The tables in Part II, suggested for use in computing the value of weighed diets, are based on 100 gram portions. In both sets of tables foods are arranged in 27 groups, starting with Beverages and ending with vegetables. The tables are unusually comprehensive, including many less common foods often omitted from such compilations.

The typography and the format of the tables are excellent. Reprinting the kind of food at the extreme right of each double page of figures is an especially happy device. The tables might be simpler and more useful if all data were expressed only in the same quantitative units used in the recommended dietary allowances of the National Research Council.

Anyone who compares the data for given foods in the various handbooks now in circulation will appreciate that most values are approximations to be used in rough estimates and broad comparisons. For such purposes it is probably wise to take all values from a single handbook and so to avoid adding still another variable to an inescapably long list. Before deciding which handbook to abide by, public health workers may well examine the revised edition of *Tables of Food Values*.

MARJORIE M. HESELTINE

A Handbook of Allergy for Students and Practitioners — By Wyndham B. Blanton, M.A., M.D., Litt.D. Springfield, Ill.: Thomas, 1942. 190 pp. Price, \$3.00.

Blanton's *Handbook of Allergy* should fulfil well the purpose for which it is primarily intended. It is a synopsis-type work, for use by the undergraduate student, to be supplemented by personal instruction. It should also serve as a handy orientation volume for graduates who wish to become acquainted with the general subject of allergy. The discussion of treatment, both specific and symptomatic, is too abbreviated for the volume to serve adequately as a therapeutic reference aid. It is hoped that in the next edition treatment will receive more detailed discussion. When used as an undergraduate text, this becomes less of a problem since the student gains his therapeutic experience in the ward and clinic.

WARREN T. VAUGHAN

Ornithologists of the United States Army Medical Corps. (*Publications of the Institute of the History of Medicine, The Johns Hopkins University. First Series: Monographs, Volume 1*)—By Edgar Erskine Hume. Baltimore: Johns Hopkins Press, 1942. 583 pp. Price, \$5.00.

The Medical Corps of the Army has given us many things of great scientific as well as practical value. We need mention only the greatest medical library in the world, the Army Medical School, "America's oldest school of preventive medicine," and the discovery of the transmission and prevention of yellow fever. Here we are told of the contributions made by Army medical officers to other branches of natural science, especially the study of the birds of the American continent.

We have been fortunate in the fact that the Surgeons General have, practically without exception, fostered scientific studies on the part of the officers, and many have purposely made assignments to foster scientific work of various types. This applies also to officers in command, such as General Leonard Wood, who was greatly interested in natural history and had much to do with the bird studies of many of the officers under him. The record is in striking contrast to some things which have happened elsewhere—for example, the near tragedy of repeated official interference with the work of Ronald Ross on malaria.

As far as the particular subject with which this book is concerned, it was fortunate that the Surgeons General as well as the Army medical officers under them between 1850 and 1860 were largely inspired by Baird of the Smithsonian Institution, created by Congress in 1846. Advantage was taken of railway and other expeditions—so much of the record of the ornithological activities of the Army medical officers

have been preserved in such reports as those of the Pacific Railroad Surveys. There was from the beginning a happy union between the Medical Corps of the Army and the Smithsonian Institution, fostered by the marriage of Professor Baird, Assistant Secretary, to the daughter of Colonel Sylvanus Churchill, Inspector General of the Army. The Smithsonian Institution has profited tremendously and in that famous Museum there are to be found the fruits of the "extracurricular" labors and studies of the members of the Army Medical Corps.

The book contains sketches of 36 Army medical officers who have contributed to our knowledge of the birds of America, a number of whom did not confine themselves to birds, but covered other valuable features of natural history. Many specimens of mammals, reptiles, fishes, and other groups were sent to the National Museum in Washington, where they are now.

There was a method in the assignment of young officers to our western country where the Army was taking part in the "winning of the West." Many articles were written and many specimens collected during this development, and it is notable that the first draft of the great book by Surgeon Elliott Coues, *Key to North American Birds*, was written at Fort McHenry.

It is interesting to note also that a number of these army surgeons showed other talents and skills. The frontispiece of this volume, for example, is the Blue-headed fly catcher, printed from the original plate drawn and engraved on copper by Dr. Anderson. Others have written excellent poetry; some have painted.

There are many more things which one would like to say about this book. It contains much history of the period when the West was being opened up and the first railroads were being pushed

across the continent. Of the 36 Army doctors mentioned, there is not one whose life does not possess much of interest scientifically as well as of value historically.

The book contains 109 illustrations. There is at least one photograph of each individual, and for some of them there are several. There are pictures of many of the famous frontier posts of the Army and a number of ornithological specimens. There is a short "Conclusion" summing up the work of Army medical officers, the names of most of whom are familiar to the world, men who have placed the people of all countries in their debt. An excellent index adds to its value.

The book is beautifully made on glazed paper, and is a masterpiece of the printer's art. We must give full credit to the author, Colonel Edgar Erskine Hume, for an enormous piece of work competently done. He has placed all lovers of natural history and scientific men in general under obligation to him, and he himself has shown a large degree of that versatile ability for which so many medical officers of the Army have been noted.

MAZYCK P. RAVENEL

Health Facts for College Students: a Textbook of Individual and Community Health—By Maude Lee Etheredge. (4th ed.) Philadelphia: Saunders, 1942. 364 pp. Price, \$2.25.

The fourth edition of *Health Facts for College Students* impresses this writer, first as being well written for and about college students, with a clear and sympathetic understanding of their problems; second, hygiene for this group is well discussed but with too little explanation. To illustrate, with regard to nutrition, the existence of body types is noted but the fact that these types are often mistakenly dieted to have them conform to the standard height-weight tables is not explained.

Students will benefit from having received health education in some form or other before entrance to college but to keep their interest they must be stimulated by a real academic challenge. Supplemented by more detail and explanation, this book can play a definite part as a text in a course in college hygiene.

GRETTA WREN

Chemistry of Insecticides and Fungicides—By Donald E. H. Frear. New York: Van Nostrand, 1942. 300 pp. Price, \$4.00.

This is an account of the chemical substances used primarily in agriculture and to some extent in industry as a protection against the attacks of insects and fungi upon plants and their products. It does not cover the protection of animals and their products from attacks by these organisms. It is of value and interest to public health because of the use of preparations of arsenic, fluorine, thallium, and other toxic substances as protective sprays upon fruits and vegetables and as poisons for destructive rodents. Detailed directions are given for the various chemical processes used in testing for the presence and amounts of these toxic substances.

Wood preservation by creosote and other organic materials is referred to only casually. The widespread use of arsenicals by fruit growers and gardeners, and their removal by uncontrolled washing devices, if at all, creates a potential health hazard which rarely comes to medical or public attention, much less to critical testing by competent public health authorities. The ephemeral nature of the results upon the individual consumer makes detection and prevention doubly difficult.

More inspection and analysis by health authorities is imperative to determine the sources, extent, and nature of these hazards. This book is a help to these ends.

CHARLES A. KOFOID

Eat What You Want—A Sensible Guide to Good Health through Good Eating—*By W. W. Bauer, M.D., and F. M. Bauer. New York: Greenberg, 1942. 263 pp. Price, \$2.00.*

This volume contains a surprising amount of exact nutrition information, presented in a popular style by a trained publicist. It attempts to make the acquisition of this knowledge as painless as possible and succeeds very well if the reader be above average in intelligence, and does not object to a loquacious rather patronizing style of writing. The book is quite evidently addressed to the economic group that can afford and can purchase satisfactory diets, though Chapter VIII comes to grips with the problem of low-cost meals. Such practical problems as meals at restaurants, drug store lunches, meals on trains, feeding children en-route are analyzed, and a plea is inserted for food purveyors to make it easier to get a good meal than to get a bad one. The box lunch for workmen or school children is presented in the light of its true importance as the source of one-third of the day's nutritional requirements.

The tabular material of the book merits particular attention, e.g., The Table of Standard Weights for Men, on pages 64–65, A Table of Median Calorie Values of Common Foods, pages 76–81, Recommended Daily Allowances of Specific Nutrients, page 85, Marketing Lists (Low Cost and Liberal), pages 184–187, and the many menu lists throughout the book.

Chapter VI on vitamins contains much good advice, e.g., "The necessary vitamins can and should be obtained by judicious selection and preparation of foods"; "nothing is to be gained by taking capsules which furnish vitamins in large excess"; "a wisely chosen diet can furnish all the necessary vitamins." Chapter VII really

gets down to practical cookery and contains 35 pages of forms and information for survey of personal diets. The debunking of food fads in Chapter 10 can be helpful to many misguided enthusiasts.

Misstatements of fact in the book are rare. Such a one as the recommendation of cooked prunes as a source of vitamin C at breakfast should be taken with extreme caution. On the whole the book can serve as a guide to individual eating, or as a sourcebook of information for public presentation. The catch phrase title should not mislead the unwary about the simplicity of the material presented.

D. F. MILAM

We Fight Syphilis and Gonorrhea
—*Prepared by Adult Education Materials Project, in coöperation with the Chicago Health Department—Syphilis and Gonorrhea Section. Chicago: University of Chicago, 1942. Teachers Book—44 pp.; Book I—19 pp.; Book II—31 pp.; Book III—44 pp.*

How to reach all levels of education and reading ability with the facts about syphilis and gonorrhea has always been a problem for the social hygiene educator. It is especially difficult to reach the adult who may be unable to read in any language or who may read only in a foreign language. The Adult Education Materials Project of the Work Projects Administration at the University of Chicago, has hit on a double-barreled solution—teach these people to read and at the same time give them the facts about syphilis and gonorrhea.

We Fight Syphilis and Gonorrhea is a series of three illustrated booklets and a *Teacher's Guide*. Books One, Two, and Three are each written at a different level of reading difficulty on the same subject, thus enabling the teacher to guide the reading of a class of varying educational training and background. Besides serving as basic texts

for the subject itself, these lessons also furnish material for the study of English—reading, pronunciation, grammar, spelling, sentence construction, and oral English.

The *Teacher's Guide* contains useful information on how to use the three lesson booklets. It includes material on class procedure, reading, spelling, and writing practice, testing the student's knowledge, and a list of suggested reading and visual aids. A wise word to the teacher warns against attempting to give personal advice. The teacher is told to direct inquiring students to clinics or physicians for detailed information or examination.

JOSEPH L. STENEK

With This Ring—By Ethel Miller Nash. New York: Association Press, 1942. 112 pp. Price, \$1.50.

In a small volume of little more than one hundred pages, Mrs. Nash has covered the life cycle from the "falling in love" period through marriage, the care and training of children, including early religious training and adolescence—necessarily each phase cannot be covered adequately. One could wish that the matter of child care and training had been left for another volume.

Mrs. Nash's suggestion that the menstrual period be utilized as a "period of meditation" will seem to some inadvisable as well as impractical. The modern woman has, in the main, learned to place little emphasis on this period. This is due, in part, to more sensible dress, consequent improvement of health, and busier and more interesting opportunities in life. The chapter on religious education will interest a limited number of parents whose point of view agrees with that of the author. Others will differ widely.

The warning concerning "war-time marriages" is timely. The author says: "Marriages contracted in wartime are not different from those contracted in

peacetime. It is rather that the difficulties of marriage are thrown into clear relief. The temptation is to reason that, because of the special circumstances, the ordinary rules of caution do not apply. Nothing could be further from the truth. Marriages should be entered into during a war emergency only after a more than ordinarily careful consideration has been given to all the elements involved. Categorical statements of a general nature are rightly suspect, but nevertheless it is possible to say that the presence of certain specific emotional and physical factors make marriage unwise in both wartime and peacetime!" Those factors are enumerated through examples of actual marriages.

VALERIA HOPKINS PARKER

Fundamentals of Psychiatry—By Edward A. Strecker, M.D. Philadelphia: Lippincott, 1942. 201 pp. Price, \$3.00.

The purpose of this book is to bring psychiatry in a "usable form to the medical student and practitioner." Its compact form "will enable the reader to obtain with a minimum of time, a workable picture of the field of psychiatry—knowledge which constantly can be interwoven with his work." These statements from the preface are well borne out by the organization of the text, which deals briefly with all parts of the subject under consideration, from historical backgrounds to present-day problems engendered by war activities.

At the present time it is particularly important for all physicians to take an interest in psychiatric matters in the light of the special investigations in psychoneuroses, and psychosomatic medicine of the past few years, during which many interrelationships with all branches of medicine and with the social sciences have been demonstrated.

There are many relatively large tomes on psychiatry, available to students and others who wish to review the subject

or to inform themselves in detail on some particular topic in mental medicine. However, there is a definite need for this volume, which is handy in size and which presents highly complex subject matter authoritatively, without becoming involved in technical or theoretical considerations; moreover it is arranged for teaching purposes in accordance with the long experience of the author who has proved its value in his teaching activities as professor at the University of Pennsylvania.

The section on war psychiatry is highly modern and presents briefly the scope of the problems confronting psychiatrists in the present emergency, summarizing the important basic conditions that should be recognized and treated.

The book should prove to be a sound, useful source of information for all workers interested in the subject. The text is illustrated by graphs and has been adequately indexed.

NOLAN D. C. LEWIS

Bacteriology for Students of Medicine and Public Health—By Einar Leifson, Ph.D. Medical Student Series, Fred C. Zapffe, Editor. New York: Hoeber, 1942. 526 pp. Price, \$5.00.

This is an attempt to present a new approach to the study of bacteriology. As expressed by the editor, the objective has been to "present what the student has time to read, and at a price he can afford to pay."

Dr. Leifson has succeeded very well in providing a streamlined text with a clear presentation of representative material drawn from the enormous field properly included under the term "Bacteriology." Five chapters are devoted to the general biology of bacteria, eight to the systematic study and classification of bacteria, and four to laboratory technic.

In addition, he has found time and

space to correlate the subject with other fields. For example, six chapters relate bacteriology to immunology and host resistance. One chapter discusses the relations of bacteriology to agriculture and industry. Other chapters discuss biostatistics, epidemiology, mycology, parasitology. Nineteen chapters deal with diseases of major importance.

In theory, such correlations are sound. In practice, they are difficult to attain to the satisfaction of all. The underlying purpose of dividing medical teaching into various branches is that the student may get more adequate and intensive instruction in these particular fields. Correlations conducted by each branch separately involve repetition which may or may not be advisable. In this particular instance the incursion into the fields of biostatistics and of clinical medicine may be debatable.

The general plan for the chapters on disease includes brief discussions of prevalence, epidemiology, diagnosis, treatment, and control. Certainly valid objections can be raised to having diagnosis and treatment of disease discussed in a course in bacteriology given to students who as yet have no clinical contacts, by instructors who carry no clinical responsibility. To illustrate, it is easy for a bacteriologist to state, "The clinical diagnosis of scarlet fever usually offers little difficulty" (page 319). The clinician, no doubt, will raise his eyebrows over that statement, because of the difficulty experienced in deciding the diagnosis of the large number of atypical cases. In the chapters on disease there occur other statements to which objection may be made. Although of minor importance they detract somewhat from the value of the book as a whole.

It is in the chapters devoted more definitely to bacteriology that the author is at his best. He presents the material clearly and concisely. Perhaps he is too concise in some instances,

but every sentence is meaningful. Moreover, he has a happy faculty of introducing explanatory material not usually available in commonly used textbooks. The student learns why stains act as they do, why differential stains of the body, capsule, flagellae, etc., are possible. Biochemical explanation of cultural characteristics is a very helpful feature. Carefully pre-

pared suggestions as to practical procedures are provided. Needed details as to culture media and animal inoculation are included. In fact, the pages are replete with information which the medical student can use with great profit. In this field, Dr. Leifson has made a definite and constructive contribution.

M. E. BARNES

BOOKS RECEIVED

INFANT AND CHILD IN THE CULTURE OF TODAY. The Guidance of Development. By Arnold Gesell and Frances L. Ilg. New York: Harper, 1943. 399 pp. Price, \$4.00.

PRACTICAL SURVEY OF CHEMISTRY AND METABOLISM OF THE SKIN. By Morris Markowitz. Philadelphia: Blakiston, 1942. 196 pp. Price, \$3.50.

THE STANDARD OF LIVING IN 1860. American Consumption Levels on the Eve of the Civil War. By Edgar W. Martin. Chicago: University of Chicago Press, 1942. 451 pp. Price, \$4.50.

SERVICES TO THE ORTHOPEDICALLY HANDICAPPED. Report of a Study made under the auspices of the Trustees of the Widener Memorial School for Crippled Children and the Board of Public Education School District of Philadelphia. Philadelphia, 1942. 115 pp.

BUILDING MORALE. By Jay B. Nash. New York: Barnes, 1942. 154 pp. Price, \$1.00.

CURRICULUM PROBLEMS IN HEALTH AND PHYSICAL EDUCATION. By Vaughn S. Blanchard. New York: Barnes, 1942. 128 pp. Price, \$1.50.

THE FOOD YOU EAT. A Practical Guide to Home Nutrition. By Samuel and Violette Glasstone. Norman: University of Oklahoma Press, 1943. 277 pp. Price, \$2.25.

COMMON EDIBLE MUSHROOMS. By Clyde M. Christensen. Minneapolis: University of Minnesota Press, 1943. 124 pp. Price, \$2.50.

REGAIN YOUR FIGURE. How to Recover the Figure after Childbirth without "Strengthening" Exercises. By Lt. Col. J. K. McConnel. Cleveland: Sherwood Press, 1939. 128 pp. Price, \$2.00.

PRINCIPLES OF MEDICAL STATISTICS. By A. Bradford Hill. 3rd ed. London: Lancet, 1942. 189 pp. Price, \$2.25.

LABORATORY MANUAL ON FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY. By A. J. Salle. 2d ed. New York: McGraw-Hill, 1943. 184 pp. Price, \$1.50.

THE FREEZING PRESERVATION OF FOODS. By Donald K. Tressler and Clifford F. Evers. New York: Avi Publishing Co., 1943. 763 pp. Price \$8.00 Domestic, \$8.25 Canada and Foreign.

PROCEEDINGS OF THE NATIONAL CONFERENCE OF SOCIAL WORK. Selected Papers, Sixty-Ninth Annual Conference, New Orleans, La., May 10-15, 1942. New York: Columbia University Press, 1942. 670 pp. Price, \$5.00.

ESSENTIALS OF NUTRITION. By Henry C. Sherman and Caroline Sherman Lanford. 2d ed. New York: Macmillan, 1943. 442 pp. Price, \$3.50.

HEALTH IN THE NEWS. Highlights in the News from the Realms of Medicine and Public Health as Prepared and Presented Weekly over Radio Station WEAN in Providence, R. I., from Oct. 31, 1941, to July 29, 1942, by John E. Farrell. Rhode Island: Providence Medical Association, 1942. 113 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Another Wind-blown Straw— Pulmonary tuberculosis in England increased during 1941 by 10 per cent over the prewar year, 1938–1939. In Scotland the increase is 18 per cent, and for non-respiratory forms the increases are 21 per cent and 28 per cent respectively in the two countries. Old, young and middle-aged groups were counted in the increases. In the young, tuberculous meningitis was the chief cause for the rise. The record hardly needs an inspired interpreter to read the handwriting.

ANON. Tuberculosis in War Time (An Editorial. *Pub. Health.* 56, 2:15 (Nov.), 1942.

Next Year's Babies—More and more, the nation's babies are being borne by very young women, but the proportion of these young women to all in the reproductive ages is decreasing. Absence of young husbands and marriageable young men will tend soon to decrease birth rates among these young women. Will the mothers—aged 30 or more—who have some children already, whose husbands are not subject to the draft, and who are now in a better economic position, help out to moderate the future unfavorable effect of war upon our birth rate?

ANON. Mothers Today Are Younger. *Statistical Bull.* (Met. Life Ins. Co.) 23, 11:1 (Nov.), 1942.

Outstanding Medical Achievement—Impressively reassuring is this analysis of pneumonia mortality. In five years the rate has decreased 63 per cent and the profile of the seasonal mortality curve has so flattened out in

the five year interval as to be almost unrecognizable.

ANON. Pneumonia Death Rate Lowest on Record. *Statistical Bull.* (Met. Life Ins. Co.) 23, 11:8 (Nov.), 1942.

Dangerous Enthusiasm—Animals develop pronounced pathological calcification of various organs during experimental hypervitaminosis (D) with pronounced pathologic changes in teeth and jaws. This, warns the author, should discourage excessive and indiscriminate vitamin D therapy.

BECKS, H. Dangerous Effects of Vitamin D Overdosage on Dental and Paradental Structures. *J. Am. Dent. A.* 29, 17:1947 (Nov.), 1942.

Paratyphoid A and B and Friends—There are more Salmonella infections than health officers generally suspect. Similar epidemiologic behavior to paratyphoid A and B is often observed with other Salmonella species. A simplified typing method is urged.

BORNSTEIN, S. Epidemiologic Aspects and Laboratory Diagnoses of Salmonella Infections. *New York State J. Med.* 49, 23:2215 (Dec. 1), 1942.

Chips from Old Blocks—Commonly held assumptions that grossly overweight children are victims of endocrine dysfunction are not borne out by this study. Restricting diet and fluid intake and adding vitamins did as much good as the administration of glandular extracts, but no therapy was efficacious until children became old enough to want to lose the handicap of excessive fat.

BRONSTEIN, I. P., *et al.* Obesity in Children. *J. Pediat.* 21, 4:485 (Oct.), 1942.

One Truth That Shall Not Prevail

—No evidence was disclosed in this controlled study that large doses of the ordinary vitamins have any effect upon colds when given to young adults on only a reasonably adequate diet. There is no cause to believe that this truth will affect the behavior of the millions who have succumbed to the advertisements which suggest that So-and-So's vitamin pills will cure all ailments known to man and beast.

COWAN, D. W., *et al.* Vitamins for the Prevention of Colds. J.A.M.A. 120, 16:1268 (Dec. 19), 1942.

Deaths in a Depression Decade

—From 1930 to 1940 the expectation of life at birth rose from 59 to 63.3 years, the increase being twice as great among negroes as among whites (though the expectation for the latter is still more than 10 years greater). Except for heart disease, cancer, and diabetes, the mortality rate of each important cause of death in 1940 was below that in 1930, and the maternal mortality rate declined uninterruptedly throughout the decade.

DORN, H. F. Changes in Mortality Rates, 1930 to 1940. Pub. Health Rep. 57, 49:1858 (Dec. 4), 1942.

When Polio Threatens Again—

Since poliomyelitis is probably acquired via the alimentary route, the oropharyngeal mucosa is obviously the first site of contact with virus from contaminated food or drink, and utensils or fingers. Virus administered to monkeys by stomach without mouth contamination supports this concept.

FABER, H. K., and SILVERBERG, R. J. Pathway of Invasion in a Cynomolgus Monkey after Oral Application of Poliomyelitis Virus. Science. 96, 2499:473 (Nov. 20), 1942.

January Hot Weather Hints—

Dengue, typhus and related rickettsias, relapsing fever, plague, and other infections that may await the traveler to

warmer parts of this western world are briefly reviewed for the benefit of those about to divest themselves of their red flannels in favor of linen clothes and pith helmets.

FAUST, E. C. Diseases in Warm Climates. Pub. Health Nurs. 34, 12:663 (Dec.), 1942.

Pneumonia Types and Typing—

Of this long and important paper, the nub that the health worker will want to remember is that, despite the great effectiveness of the sulfonamide drugs, there are some cases of pneumonia (especially of the higher pneumococcus types) that are helped by the administration of the homologous serum. Pneumonia typing is by no means a dead duck.

FINLAND, M. The Present Status of the Higher Types of Antipneumococcus Serums. J.A.M.A. 120, 16:1294 (Dec. 19), 1942.

Not a Very Good Year—In

Canada, 1941 was a year of epidemics. Measles, scarlet fever, and mumps were all well above averages. Infant deaths were higher than the year before as were the tuberculosis death rate and those of most of the chronic diseases among the principal causes of death.

HEAGERTY, J. J. State of Health of the People of Canada in 1941. Canad. Pub. Health J. 33, 11:517 (Nov.), 1942.

Antidote for Cocksurenness—Are you one of those who have become hypercritical of all governmental war efforts, poisoned perhaps by the continuous barrage of carping censure from our self-appointed Jeremiahs of press and radio? Then read this review of some of the "little" problems we have had to overcome in addition to the big ones of raising and equipping an army and a navy.

HOLMES, H. N. National Survival through Science. Science. 96, 2498:433 (Nov. 13), 1942.

Another Prop Neatly Pulled—

On the other hand, are you one of

those ready-believers, who has assumed right along that chaulmoogra oil is a specific against leprosy and that the only considerations are early and intensive administration? After reading this paper you will no longer pontificate glibly upon the subject. It seems that the stuff is of extremely doubtful value!

McCoy, G. W. Chaulmoogra Oil in the Treatment of Leprosy. *Pub. Health Rep.* 57, 46:1727 (Nov. 13), 1942.

Testing Insanitary Glassware—Instead of swabbing the lips of drinking glasses the proposed method involves coating the glassware with a thin film of nutrient agar which encourages the organisms to grow *in situ*. The method is simple, requires no apparatus, gives direct and accurate results. Dramatically too.

NOVAK, M., and LACY, A. M. A Quantitative Method for Determining the Bacterial Count of Glassware. *Am. J. Hyg.* 36, 3:316 (Nov.), 1942.

Peerings into the Virus Shadowland—Are viruses macromolecules or small organisms? In recent electron micrographs the virus particles seem to resemble bacteria. Rod shaped viruses, like many rod shaped bacteria are uniform in width but vary greatly in length. Particles of spherical viruses like most cocci have relatively uniform diameters.

RAWLINS, T. E. Recent Evidence Regarding the Nature of Viruses. *Science.* 96, 2497:425 (Nov. 6), 1942.

Words That Butter Parsnips—

For the responsible, ex-sanatorium patient who may become occasionally infectious, personalized health education may be the answer, and his schooling should be done while in the sanatorium. The public health nurse should be able to do the rest, if the education were adequate—which frequently it is not.

SODERSTRON, K. M. Management of Patients With Occasionally Positive Sputum after Apparently Adequate Therapy (and two companion papers). *Am. Rev. Tuberc.* 46, 5:483 (Nov.), 1942.

Fallibilities—Read this classic discussion of the present-day status of our treatment of venereal diseases even though you haven't the slightest professional contact with the subject—just for the exhilarating and pleasurable experience of seeing this so human presentation of a scientific treatise. Not twice in a blue moon will you run across as sparkling and provocative—and irritating—a paper as this. Incidentally you'll get the low down on "wonder cures," prophylaxis, and kindred controversial subjects.

STOKES, J. H. The War Time Control of Venereal Disease. *J.A.M.A.* 120, 14:1093 (Dec. 5), 1942.

ASSOCIATION NEWS

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Haskell R. Anderson, M.D., Blaine County Health Unit, Watonga, Okla., Director
Patrick C. Bruno, 655 Broadway, Revere, Mass., Health Officer and Milk Inspector, Revere Health Dept.
Edwin Bruce Godfrey, M.D., Court House, El Centro, Calif., Imperial County Health Officer
Erwin Goemann, Ph.G., 234 Main St., Ridgefield Park, N. J., Health Officer
Harold LeRoy Guterman, M.D., Dr.P.H., Cherry Creek Indian Reservation, Cherry Creek, S. D., Physician, U. S. Indian Service
O. Emerson Ham, M.D., 23 E. Charlton St., Savannah, Ga., Asst. City-County Health Officer, Savannah-Chatham Health Dept.
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John Mack Kirby, M.D., 1830 Flower, Bakersfield, Calif., Kern County Health Officer
Irving H. Mauss, M.D., Court House, Hot Springs, S. D., Asst. Surgeon (R), U. S. Public Health Service; Director, Fall River and Custer Counties Health Dist.
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Frances MacKinnon, M.S., 1709 Washington Ave., St. Louis, Mo., Director, Nutrition Service, Midwestern Area, American Red Cross
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 Dr. Frederick Rubli, Productos Nestle, Ocotlan, Tal., Mexico, Scientific Adviser
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 Howard A. Trumbull, Owens Illinois Glass Co., Toledo, Ohio, Merchandise Manager
 Richard Viola, 5548 Delmar Ave., St. Louis, Mo., Acting Supervisor, Food Inspection Service, St. Louis Health Div.

Public Health Education

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Public Health Nursing Section

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Unaffiliated

Hazel Merrick, D.D.S., 808 North Spring St., Los Angeles, Calif., Chief Public Health Dentist, Los Angeles County Health Dept.
 Maurice S. Reizen, Medical Detachment at Large, Morrison Field, West Palm Beach, Fla., Adjutant, Station Hospital

DECEASED MEMBERS

Donald E. Cummings, Denver, Colo., Elected Member 1935, Elected Fellow 1941, Industrial Hygiene Section
 Charles R. Hoover, Ph.D., Middletown, Conn., Elected Member 1930, Laboratory Section
 Howard B. Mettle, M.D., St. Louis, Mo., Elected Member 1936, Elected Fellow 1939, Maternal and Child Health Section
 Blanche Potter, New York, N. Y., Elected Member 1923, Unaffiliated
 Arthur H. Thomas, Philadelphia, Pa., Elected Member 1913, Unaffiliated

DR. GEORGE T. PALMER APPOINTED TO A.P.H.A. STAFF

The American Public Health Association announces the appointment of George T. Palmer, Dr.P.H., of New York, N. Y., as Associate Field Director for the Committee on Administrative Practice, succeeding Benjamin G. Horning, M.D., M.P.H., who recently resigned to become Field Director for the W. K. Kellogg Foundation, Battle Creek, Mich.

Dr. Palmer has been Deputy Commissioner of the New York City Department of Health for the past nine years. He is a graduate of the University of Rochester in 1907 and the Massachusetts Institute of Technology in 1909 and he received his Dr.P.H. degree from the University of Michigan in 1920.

Beginning his public health service with the New Jersey State Department of Health, he was a Sanitary Inspector

until 1913, when he became chief of the investigative staff of the New York State Commission on Ventilation, engaged in experimental research in the ventilation of school buildings in New York City, in which he served until 1917. Dr. Palmer was commissioned Captain in the Sanitary Corps in the Army from 1917 to 1919, acting as assistant to Colonel Victor C. Vaughan.

He next became Epidemiologist and Deputy Commissioner in the Detroit Department of Health from 1919 to 1923, then returned to New York City, and for eleven years was Director of Research of the American Child Health Association. While in this position he directed a survey of health activities in the smaller cities of the country. This work was published under the title "A Health Survey of 86 Cities." Other work under his guidance during this period included the school health studies published in monograph form from 1929 to 1933 and the research study published in 1934 under the title "Physical Defects—The Pathway to Correction."

Dr. Palmer has been a member of the American Public Health Association

since 1911 and has participated actively in its work. He is a Charter Fellow. He has served as Chairman of the Child Health Section and is now a member of the Governing Council. He has been a member of the Committee on Administrative Practice since shortly after its formation in 1920, was Chairman of the Sub-Committee on the Appraisal Form for City Health Work and guided this form through several revisions. At present he is Chairman of the Sub-Committee on the Manual and Appraisal of Local Health Work.

He is the author of many reports and articles on public health published in the *American Journal of Public Health* and elsewhere, and participated with Dr. Henry F. Vaughan and Dr. Victor C. Vaughan in the volume on "Epidemiology and Public Health."

For a number of years he has been a special lecturer on public health administration at the Massachusetts Institute of Technology, St. Johns University, and the Long Island College of Medicine in New York, N. Y. He is also Vice-President of the New York City chapter of the American Society for Public Administration.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

U. S. CIVIL SERVICE COMMISSION. Public Health Nursing Consultants, 5 grades. See November *American Journal of Public Health*, or write U. S. Public Health Service, Washington, D. C.

Merit System Council, Oregon State Board of Health and Crippled Children's Division, has announced merit examinations in practically all public health fields. See November *American Journal of Public Health*, or write H. J. Sears, Merit System Supervisor, P. O. Box 88, Portland, Ore.

Indiana State Personnel Division announces that applications may be filed for positions in orthopedic nursing, medical positions (5 classes), and local public health director. See November *American Journal of Public Health*, or write Indiana State Personnel Division, 141 South Meridian Street, Indianapolis, Ind.

Physician, man or woman, as director of Division of Maternal, Child and School Hygiene in southern city department of health. Woman physician with pediatric training preferred, public health experience not essential. To operate prenatal, infant and preschool clinics and promote school health program. Salary commensurate with ability and qualifications of applicant. Apply Box J, Employment Service, A.P.H.A.

Southern state department of health seeks several obstetric and pediatric consultants, requiring a minimum of a year's residency in a specialty, immunity to draft and preferably training in public health. Men and women are eligible. Salary \$300 per month plus travel. Apply Box C, Employment Service, A.P.H.A.

Public Health Engineer and director of Division of Sanitation of a city and county health unit; population 145,000 in the Midwest. Salary \$3,180 and travel allowance. Box E, Employment Service, A.P.H.A.

The Flint Civil Service Commission will consider applications for Executive Health Officer of the Flint Department of Health. Applicants must be medical graduates with a valid license to practise medicine in Michigan or eligibility for

such license; also must have practised medicine and surgery for five or more years and had considerable experience in public health work. There will be no written test, qualification being judged solely from review of experience, education and training and an oral examination. Present incumbent is on military leave of absence under circumstances which will probably extend for a period of five years. Staff consists of over fifty professional and technically trained employees. Probable salary \$5,400. Inquiries should be directed to Foster B. Roser, Director, Flint Civil Service Commission, City Hall, Flint, Mich.

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

Public health nurses wanted for two-county unit in Michigan. Must be graduates with minimum of 4 months' public health training or 8 months' training under supervision. Salary \$1,800 per year with travel allowance \$35 to \$41 per month. Must drive and own a car. Address Dr. Koupal, Director Alger-Schoolcraft Health Dept., Manistique, Mich.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years

or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Wanted: School Dental Supervisor to administer and operate dental program in City schools and clinics in City 50,000 population. Salary \$3,000 to \$3,600 with travel allowance. Those interested should address Dr. W. A. Browne, City Health Department, Alexandria, Va.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

M.D., Dr.P.H., interested mental and industrial hygiene, chief of mental hygiene clinic, on staff of psychiatric hospital, speaker, writer, author of books on health, diplomate in psychiatry, professor of psychiatry. Ineligible for military service because of age, healthy, vigorous, able

to work hard, now in private practice; would make sacrifice and accept decent but lower remuneration than present income if he could be employed in war industry, preferably New York, New Jersey, or Connecticut. United States citizen. Had important government job in last war. Speaks and writes several languages. A-504.

NEWS FROM THE FIELD

AWARD OF GORGAS MEDALS

The Association of Military Surgeons of the United States recently awarded the first three medals in honor of Major General William Crawford Gorgas to Brigadier General Jefferson Randolph Kean, retired, who was chief surgeon of the Department of Western Cuba in 1900; to Brigadier General Frederick Fuller Russell, retired, of the Harvard School of Public Health, Boston; and to Rear Admiral Edward Rhodes Stitt, who recently retired after 42 years of service in the Naval Medical Corps, including 8 years as Surgeon General. The medals have been provided by John Wyeth and Brother, Philadelphia, and consist of silver medals and checks for \$500.

VITAMIN C PLACED UNDER ALLOCATION CONTROL

The War Production Board announced on December 15 that ascorbic acid (vitamin C) had been placed under allocation control through the issuance of *General Preference Order M-269*. Development of the use of vitamin C in food and medicinal production for the armed forces was the primary cause for the action, as production was formerly geared to meet pharmaceutical needs. Present production does not meet current estimated requirements, and although production capacity is being increased, demands for 1943 probably will be more than double the 1942 figures. Enough will be available, however, it was stated, for essential civilian use. The Quartermaster Corps of the Army is using large quantities of this vitamin in the "K" and "Jungle" rations and there is a substantial demand for Lend-Lease requirements. Sorbitol, which also has

recently been placed under allocation control, is one of the principal raw materials needed for the production of vitamin C.

ROSENBERGER MEDAL AWARDED TO MISS LENROOT

Katharine Lenroot, Chief of the Children's Bureau of the Department of Labor, Washington, on December 18 received the Rosenberger Medal at a convocation of the University of Chicago. The award was in recognition of her 30 years of service to the welfare of children in North and South America. Miss Lenroot is a graduate of the University of Wisconsin, served with the Wisconsin Industrial Commission, and has been identified with the Children's Bureau since shortly after its establishment in 1912. She has served as Chief of the Children's Bureau since 1934.

PHILADELPHIA COURSE IN INDUSTRIAL MEDICINE AND HYGIENE

The Philadelphia County Medical Society and the Commission on Industrial Health and Hygiene of the Medical Society of the State of Pennsylvania have announced a postgraduate course in industrial medicine and hygiene to be offered in Philadelphia January 5 to February 27 under the direction of the Department of Public Health and Preventive Medicine of the University of Pennsylvania and the Woman's Medical College of Pennsylvania. The courses are timed from 4 to 6 P.M. on Tuesdays, Thursdays, and Saturdays, and include, among other subjects, Physical Factors and Hazards, Surgical Aspects, Disease Hazards of Industry, Toxicology, Practical Applications of Industrial Medi-

cine, Compensation and Medico-Legal Factors, and Plant Sanitation. The Chairman of the Committee in charge is Lt. Col. A. Parker Hitchens, M.C., U.S.A., Department of Preventive Medicine and Public Health, University of Pennsylvania and Sarah I. Morris, M.D., Secretary, of the Department of Preventive Medicine, Woman's Medical College of Pennsylvania.

NEW YORK CITY'S HEALTH IN 1942

Ernest Lyman Stebbins, M.D., M.P.H., New York City Commissioner of Health, reported on January 1 that the year 1942 recorded for New York City its lowest infant death rate and new low mortality rates were established for diphtheria, typhoid fever, pneumonia, tuberculosis, and appendicitis. The general death rate for 1942 was 10.0 per 1,000, the record low of 9.9 having been set in 1941. The birth rate was 17.4, the highest since 1930, and the infant mortality rate 28.8 per 1,000 births.

On the unfavorable side of the picture he recorded an increase in syphilis cases which previously had been decreasing substantially. Reported syphilis cases were up 13 per cent in 1942. The death rate from tuberculosis, all forms, per 100,000, was 46.3, currently arresting the slight rise in this rate in 1941.

In a population of over 7½ million persons there were 7 deaths from diphtheria during the year. Dr. Stebbins points out that there are 8 health districts within the city which had had no diphtheria deaths for at least 4 years, and one had had no deaths for 7 years. These districts average 250,000 population.

STAFF CHANGES IN THE MEDICAL DIVISION O.C.D.

Howard H. Potter, recently water works engineer of the Maine Public Utilities Commission, Augusta, has been

appointed Regional Sanitary Engineer of the First Civilian Defense Region, O.C.D., with headquarters in Boston. John H. Brewster, New York, now of the Second Region, formerly served as sanitary engineer for both the first and second regions.

Dr. Mark V. Ziegler, Senior Surgeon, U. S. Public Health Service, recently Public Health Service District Director in the Third District, is now Regional Medical Officer for the Third Civilian Defense Region, with headquarters in Baltimore. Dr. Ziegler succeeded Dr. W. Ross Cameron who is now assigned to the Federal Housing Administration. Dr. Lloyd H. Gaston, formerly deputy chief of Emergency Medical Service in Michigan, is assistant Regional Medical Officer.

Dr. Ford S. Williams, recently Assistant Regional Medical Officer in the Ninth Civilian Defense Region with headquarters in San Francisco, has been transferred to the Eighth Region as Assistant Regional Medical Officer. He will be associated with Dr. Witten B. Russ in the Regional Office at Dallas, Tex.

DENTAL SALVAGE PROGRAM

R. K. White, Chief of the General Salvage Branch of the Conservation Division, WPB, announced that in collaboration with the American Dental Association, A National Dental Salvage Program has been organized and will be directed by the association among all members of the dental profession.

The program, calling for the conservation of all dental material and equipment as well as the scrapping of obsolete rubber and metal objects, has been initiated to function through local dental societies.

O.C.D. BULLETIN ON SANITATION

Maintenance of sewer service in bombed areas has been one of the major difficulties confronting municipal

authorities in cities under enemy attack. To assist American municipal officials and defense councils in planning for emergencies and for the restoration of normal service following damage resulting from enemy action, the sanitary engineering section of the Medical Division of the Office of Civilian Defense has issued its second sanitary engineering bulletin, "Municipal Sanitation under War Conditions."

Sanitation problems constituting grave dangers to public health may result from direct damage to sewers or from failure of the water supply, making water carriage facilities inoperable, the bulletin points out. To meet these problems, two measures are necessary: (1) strengthening of the municipal department responsible for sewer service in both personnel and material, and (2) coöperative planning with the local defense council and other municipal departments so that they may be integrated to function in an emergency.

The bulletin emphasizes the importance of accurate and complete information on the sewerage system, such as maps and records of all critical points at which a broken line would create a serious drainage problem and interrupt service over a considerable area. Inventories of material, personnel, and equipment that could be used in the event of necessity are of value, not only to the sewer department but also to other municipal departments, public utilities, or neighboring communities. Such inventories should even include the resources of local dealers or manufacturers of building material, explosives, pipe and equipment that could be used in reconstruction of sewers, the O.C.D. sanitary engineers advise. Another point stressed is that essential equipment, personnel, and material should be distributed throughout a city to avoid loss of equipment through a chance bomb hit and to lessen the possibility

of being blocked from movement by obstructed streets.

It is urged that municipal departments work closely with defense councils in order that emergency functions may be carried out with a minimum of difficulty. For example, it is pointed out that in order to function, persons and vehicles must be identified by the proper Civilian Defense insignia. Telephone service must be integrated with that of the Control Center or it may not be available in an emergency.

Suggestions are given in the bulletin on repair of damage to sewers, including advice on inspection, emergency equipment, and special measures to provide for the flow of sewage during repair.

Three methods of emergency sanitation, to be used when interruption of water service makes water-carried waste impossible, are suggested in the bulletin: handling and disposal by individual householders, temporary disposal devices set up in territory adjacent to the affected area, and a scavenger system in which containers are collected and transported to a point of disposal.

One section of the bulletin is devoted to discussion of municipal waste collection and disposal in the event of enemy action. Little can be done to protect collection facilities against damage except to disperse collection units in several locations when not in use. New methods of disposal or changes in disposal site offer more difficulty than the maintenance of collection service. Usable material may be salvaged and combustible material may be burned near the place of origin.

The sanitary land-fill is recommended as the method of disposal that could be most readily adopted. The problem of operating an incinerator during a blackout is also discussed.

The bulletin gives brief suggestions for protection of plants, with references

to special publications of the Office of Civilian Defense on protective concealment, protective construction, and glass protection.

An appendix to the bulletin contains *Operations Letter No. 29* issued by the Office of Civilian Defense on "Utility Repair Squads" and *Operations Letter No. 37*, which explain how utility personnel may be authorized to perform their duties during blackouts; designs for emergency latrines or privies; photographs and description of a newly developed sanitary excreta bag, and a bibliography of recent literature pertinent to the subject.

SAN FRANCISCO OPENS THREE PROPHYLACTIC STATIONS

Dr. J. C. Geiger, Director of Public Health of the City and County of San Francisco, has announced the opening of three prophylactic stations to be operated by his department in coöperation with the Army and Navy. The personnel is furnished through the Army and Navy, and the supplies and equipment through the Division of Venereal Diseases of the San Francisco Health Department. The operation of the stations is said to be unique in that prophylaxis will be administered to civilians as well as to the armed forces. During the first month of operation 23 per cent of the service was to civilians.

In order to secure adequate publicity 5,000 lavatory placards were distributed through the city by members of the local health department and the armed services. Half a million leaflets advertising the locations of the stations have been distributed to armed forces in the San Francisco area.

LINDBERGH HOME TO BE V.D. TREATMENT CENTER

The New Jersey State Department of Health has announced that the former home of Charles A. Lindbergh near Hopewell will become a rapid

treatment center for venereally infected women. The estate, which includes about 400 acres in the Sourland Mountains, was given to the State of New Jersey last year by Mr. Lindbergh and his wife. It will be operated under the direction of Dr. Glenn S. Usher, the Chief of the Health Department Venereal Disease Bureau.

PSYCHIATRIC SERVICE IN VENEREAL DISEASE CLINIC

Dr. J. C. Geiger, Director of Public Health, has announced the opening of the psychiatric service of the San Francisco City Venereal Disease Clinic. The psychiatric service is established as a special field study project by the U. S. Public Health Service and offers the only psychiatric service of this type that has been established in direct conjunction with a venereal disease clinic in the United States.

The service will be based on an individualized case study plan. The purposes and objectives of the psychiatric service of the clinic are to provide a reëducation and readjustment program for girls and women who offer a promiscuous sex history and who may spread or are spreading venereal diseases. In the venereal disease epidemiologic interviews on female patients reported as sources and contacts of venereal disease public health nurses and physicians secure information as to the socio-economic background of these patients. Those cases which show maladjustment will be referred to the psychiatric service which will evaluate each case referred and will attempt through the psychiatric and case work approach to offer these patients social and economic readjustment. This psychiatric service will not attempt to assist in the readjustment of confirmed prostitutes but only the non-professional, promiscuous cases.

No residence or financial requirements prevail in so far as the psychiatric

service is concerned, and the service is in position to consider cases referred from outside sources. Arrangements will be made with various nonofficial agencies to provide funds in certain instances to carry out recommended psychiatric treatment plans. Attempts will be made to relocate the patients through coöperation of official and nonofficial agencies concerned.

The medical director of the San Francisco City Clinic is the Chief of the Division of Venereal Diseases, Dr. Richard A. Koch. The Director of the Psychiatric Service of the clinic is Dr. Ernest G. Lion, who is instructor in psychiatry at the Stanford University School of Medicine. The personnel of the service will consist of the psychiatrist, a chief psychiatric social worker, an assistant social worker, with two clerks.

ENGINEERING DEPARTMENT AT NORTHWESTERN RECEIVES MAGNIFICENT GIFT

A bequest of more than 20 million dollars to Northwestern University in the will of Walter P. Murphy, manufacturer of railway supplies, who died on December 16, has been announced. The fund will be used to develop, maintain, and operate the Technological Institute of Northwestern University which was founded in 1939 with a gift of \$6,735,000 from the Walter P. Murphy Foundation. The Board of Trustees of the university was given freedom in deciding how the funds should be used and it is provided that instruction in science to other than engineering students is permissible. A new building, erected recently at a cost of 5 million dollars, was dedicated in 1942 and houses the departments of civil, chemical, mechanical, and electrical engineering of the institute, and the departments of physics and chemistry of the university. It is operated on the "work-study" plan in which student

engineers alternate 3 months of study on the campus with equal periods of work in coöperating industries. Approximately 95 industrial organizations in 13 states coöperate with the institute in its work-study program.

NATIONAL RESEARCH COUNCIL ORGANIZES COMMITTEE ON SANITARY ENGINEERING

A sanitary engineering committee has been organized at the request of the Surgeon General of the Army by the National Research Council through the Division of Medical Sciences, acting for the Committee on Medical Research of the Office of Scientific Research and Development. Through liaison officers, advice and assistance in regard to sanitary engineering problems are also furnished to the Navy and the Public Health Service.

In the formation of the committee, epidemiological and entomological advice was deemed necessary and personnel representing these sciences was included. Close liaison with the Office of the Surgeon General of the Army is maintained through the Sanitary Engineering Branch, Division of Preventive Medicine. The committee consists of Abel Wolman, Dr. Eng., Chairman; Kenneth F. Maxcy, M.D., Secretary; Harold E. Babbitt; F. C. Bishopp; V. M. Ehlers; Gordon M. Fair; H. A. Whittaker.

In the several meetings to date, the committee has devoted major efforts to the problem of procurement and training of the large number of sanitary engineering personnel required for essential war activities. In addition to the needs for sanitary engineers as commissioned officers in the Sanitary Corps of the Army, the U. S. Public Health Service and the Corps of Engineers utilize sanitary engineers on a civil service status.

The committee has also considered the sanitary engineering functions performed by the Sanitary Corps of the

Army with a view toward providing constructive suggestions on the many problems occasioned by the war, including the safeguarding of Army water supplies, the disposal of waste, and malaria control.

The program covering future activities of the committee includes a continuation of its present work on the availability of and the demand for sanitary engineering personnel; the orderly procurement of and assignment to military, semi-military, and civilian agencies of trained sanitary engineers, information on military sanitary engineering problems and their solution; and a consideration of post-war needs for sanitary engineers and the fields in which they may be most profitably utilized.

The committee has had strong liaison representation from the War Department, by the presence in the deliberations of Colonels Simmons, Hardenbergh, Prentiss, and Robinson; from the Navy by Admiral Stephenson and Commanders Cushing, Tinton and Burton; from the U. S. Public Health Service by J. K. Hoskins, and from the Selective Service in the person of Major Robert A. Bier. The National Research Council representatives in the deliberations have been Drs. Weed, Davison, Forbes, and Colonel Larkey.

LEPROSY IN THE UNITED STATES

Leprosy has been introduced into different areas of the United States with very different consequences. In Louisiana, Florida, and Texas the presence of imported cases has resulted in the establishment of foci in which the disease shows a strong tendency to perpetuate itself, while in the central northwestern states and in California the reverse prevails and the disease has shown little tendency to become established. Elsewhere in the United States leprosy transmission occurs so rarely that it is negligible from the public health point of view.

The data presented refer to experience with leprosy up to the present time. But in an age in which great changes, both social and economic, are occurring, no one can predict what unexpected influence these may have on the occurrence of leprosy as well as other diseases.

From: *Observations on Epidemiology of Leprosy*, by G. W. McCoy, Medical Director (R), U.S.P.H.S., *Public Health Reports*, 57, 51, 1942.

BUCHANAN MEDAL AWARDED TO SIR WILSON JAMESON

The British Royal Society, through its President, Sir Henry Dale, C.B.E., has announced that the Buchanan Medal of the Royal Society has been awarded to Sir Wilson Jameson, now Chief Medical Officer of the Ministry of Health and the Board of Education. Sir Wilson was formerly dean of the London School of Hygiene and Tropical Medicine. He is an Honorary Fellow, A.P.H.A. According to the announcement, Sir Wilson's claim to the award is based on "administrative and constructive work" of outstanding merit in the service of hygienic science. Sir Wilson "has shown himself to be a man of stimulating influence and leadership, determined and persistent in his efforts to insure that advances of medical knowledge in the laboratory, the clinic and the field shall receive prompt application in administrative practice."

DR. JOHN L. RICE APPOINTED CONSULTANT TO LEDERLE LABORATORIES

John L. Rice, M.D., who recently resigned as Commissioner of Health, New York City, has joined the staff of the Lederle Laboratories, Inc., New York, as consultant to advise on developments related to public health. Dr. Rice is immediate past President of the A.P.H.A.

A native of Connecticut and a graduate of Wesleyan University and the Johns Hopkins Medical School, Dr. Rice

has held posts with the International Health Board, Rockefeller Foundation, as district state health officer in New York, as health officer of New Haven, Conn., and as Commissioner of Health of New York City. Dr. Rice has studied municipal public health in Europe and was a member of the commission sent to the Scandinavian countries to study venereal disease control in 1936.

Lederle Laboratories was founded in 1906 by another New York City health commissioner, Dr. Ernest J. Lederle. It is a producer of sera, vaccines and related medicinal products, and of drugs used in chemotherapy.

A luncheon in honor of Dr. Rice was given at the New York Academy of Medicine on January 21 by his friends and colleagues.

PUBLIC HEALTH NURSING IN WARTIME

The extraordinary demands of the times on public health facilities together with the shortage of health personnel now creates unprecedented problems for many health officers. Since public health nurses quantitatively represent a large portion of any public health staff, the attention of health officers is called to a statement, *Maintaining Minimum Public Health Nursing in Wartime*, recently prepared by the National Organization for Public Health Nursing. A copy of this statement has been sent by the N.O.P.H.N. to every full-time health officer in the United States.

NEW GRANT FOR TEACHING AND RESEARCH IN TROPICAL MEDICINE

A 5 year program of research and teaching in tropical medicine, supported by a gift of \$150,000 from the Josiah Macy Jr. Foundation, New York, N. Y., was announced in January by Dr. Willard Cole Rappleye, dean of the College of Physicians and Surgeons of Columbia University and President of the Josiah Macy Jr. Foundation.

In announcing the gift Dr. Rappleye said that after the war it was expected that there would be an increase in the amount of tropical disease in this country because members of the armed forces will return in large numbers from countries where tropical diseases are widespread. He predicted that malaria and dysentery will be the two principal diseases. He anticipated also that increased economic and industrial aid will be provided by the United States government to tropical areas after the war, which will entail medical help to the native populations and will necessitate extensive training of doctors, nurses, and public health workers.

A regular department of tropical medicine will be set up in the De Lamar Institute of Public Health at Columbia University, of which Harry S. Mustard, M.D., is the Director. The Institute is housed in the Washington Heights Health Center, 600 West 168th Street, New York, N. Y. Coöperation is assured between the School of Tropical Medicine at the University of Puerto Rico, maintained by Columbia University, which will be used as one of a number of field stations where personnel may receive additional training in the courses to be offered.

DR. HALVERSON APPOINTED CALIFORNIA STATE HEALTH OFFICER

The appointment of Wilton L. Halverson, M.D., Dr.P.H., of Los Angeles, as State Health Officer of California has been announced by Governor Warren, to take effect in January. Dr. Halverson succeeds Bertram P. Brown, M.D., who has served for several years. Dr. Halverson was appointed County Health Officer in the Los Angeles County Department of Health in 1942 and has been given a temporary leave of absence from his Los Angeles County position. Dr. Halverson is a graduate in medicine of the College of Medical Evangelists and in public health from

Yale University. He was formerly the Health Officer of Pasadena and is Professor of Public Health and Preventive Medicine in the College of Medical Evangelists in Los Angeles.

PERSONALS

Central States

KENNETH E. BENNETT, M.D., of Strasburg, Ohio, has resigned as Health Officer of Tuscarawas County, to enter the U. S. Army Air Corps. BURT A. MARQUAND, M.D., of Denison, will continue as Health Officer of Atchison until January 1, 1944.

BERT E. CALDWELL, M.D., who for 15 years has been Executive Secretary of the American Hospital Association, Chicago, Ill., has announced his resignation, effective on the appointment of a successor.

HARRY J. DEETHS, M.D., has been appointed Health Officer of Atchison, Kans.

ROBERT A. EVANS, M.D., of Columbus, Ohio, has recently been appointed Health Officer of Franklin County.

EARL E. KLEINSCHMIDT, M.D., DR.P.H.,* since 1938 Associate Professor and Chairman of the Department of Public Health, Preventive Medicine and Bacteriology at the Loyola University School of Medicine, Chicago, Ill., has been appointed Health Commissioner of Toledo, Ohio, succeeding JOHN L. LAVAN, M.D., DR.P.H.,* who recently resigned to become Director of Scientific Research for the National Foundation of Infantile Paralysis, New York, N. Y.

HAROLD F. MINSHULL, M.D., of New Lexington, Ohio, Coroner of Perry County, has been chosen Health Officer of the County, succeeding the late FRANK J. CROSBIE, M.D., of New Lexington.

WALTER N. MUNDELL, M.D., of Hutchinson, Kans., has been named Health Officer of Reno County.

MILTON E. PARKER,* Manager of Production for the Beatrice Creamery Company, Chicago, Ill., participated in a four weeks orientation course at the Command and General Staff School, Fort Leavenworth, Kans., "for civilians especially selected from among civic, business and professional leaders of the country" at the invitation of Lieutenant General Brehon Somervell, A.U.S. Mr. Parker has been serving for several months as special advisor, Military Planning Division, Research and Development Branch, Office of the Quartermaster General, Washington. He has recently been elected Chairman of the Chicago Section of the Institute of Food Technologists.

ERIC P. PFEIFFER, M.D., C.P.H.,† Director of the Division of Vital Statistics, Iowa State Department of Health, Des Moines, has been placed on leave in order to return to active duty in the Army.

Eastern States

OTTO A. BESSEY, PH.D., formerly research associate in pathology and associate in biologic chemistry, Harvard Medical School, Boston, Mass., has been named Director of the Public Health Research Institute of the City of New York; Inc., for the duration of the war, replacing RALPH S. MUCKENFUSS, M.D.,* who has been called into Army service. Dr. Bessey is also Chief of the Division of Nutrition and Physiology of the Institute. Dr. Muckenfuss's position as Director of the Bureau of Laboratories of the City Department of Health is being filled by WHEELAN D. SUTLIFF, M.D.,* as Acting Director.

JOHN R. PAUL, M.D.,† Professor of Preventive Medicine at Yale University, New Haven, Conn., delivered the third Harvey Society Lecture of the current series at the New York

Academy of Medicine in December. The subject was Poliomyelitis.

BRET RATNER, M.D.,† Clinical Professor of Pediatrics, New York University College of Medicine, has been appointed Visiting Pediatrician and Director of Pediatrics to the Sea View Hospital, New York, N. Y., to succeed BELA SCHICK, M.D., who has retired with the title of Consultant Pediatrician.

Southern States

JOHN F. BUSCH, M.D.,† has been appointed Director of the American Red Cross Medical and Health Service in the Eastern Area, with headquarters in Alexandria, Va., effective February 1. Since 1937, Dr. Busch has been Assistant to the Director of Tuberculosis Control in the Georgia State Department of Public Health, Atlanta.

JOHN L. DOROUGH, M.D., of Buffalo Cove, N. C., has been elected Health Officer of Cleburne, Ala., with headquarters in Heflin.

THOMAS H. D. GRIFFITTS, M.D., D.P.H.,† who until his recent retirement was Chief Quarantine Officer of Puerto Rico and the Virgin Islands, with headquarters in San Juan, is now Health Director of the consolidated health unit in Dade County, Miami, Fla.

WILLIAM P. JACOBS, M.D.,† of Raleigh, N. C., at one time State Health Officer, has been appointed Director of School Health Coordination in the State Board of Health. The position is subsidized by the Rockefeller Foundation and is a joint project of the State Board of Health and the State Department of Public Instruction.

JAMES A. KENNEDY, PH.D.,* Professor of Public Health and Bacteriology,

University of Louisville School of Medicine, Louisville, Ky., has been accepted for a course in tropical medicine at Tulane University of Louisiana School of Medicine, New Orleans, beginning January 4. This is one of the new fellowships recently established by the Association of American Medical Colleges under a grant from the John and Mary R. Markle Foundation. On completion of the course on February 27 Dr. Kennedy will return to the University of Louisville School of Medicine.

JOHN A. LINEBERRY, M.D., of Kenansville, N. C., has been chosen Health Officer of Harnett County, to succeed WILLIAM B. HUNTER, M.D.,† of Lillington, who has been called into active service.

FRANK M. MELTON, M.D., of LaGrange, Ky., has resigned as Health Officer of Oldham County.

HOWARD D. SCHMIDT, B.D.,† Director of the Division of Sanitary Engineering of the Tennessee State Department of Public Health, Nashville, has resigned to accept a position as Principal Sanitary Engineer at the Institute of Inter-American Affairs for work in South America.

GARLAND L. WEIDNER, M.D., of Elba, Ala., Health Officer of Coffee County, is now also in charge of Geneva County.

Western States

CLYDE A. BRIDGER,* who for 4 years was statistician with the Idaho Department of Public Health in Vital Statistics, Boise, is now instructor in mathematics at the University of Utah, Salt Lake City.

Canada

A. GRANT FLEMING, M.C., M.D., D.P.H., F.R.C.P.,* Strathcona Professor of Public Health and Preventive Medicine, McGill University, Montreal; and Medical Director,

* Fellow A.P.H.A.

† Member A.P.H.A.

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Mosquito Vectors and Inapparent Animal Reservoirs of St. Louis and Western Equine Encephalitis Viruses*

W. McD. HAMMON, M.D., DR.P.H., W. C. REEVES, AND
M. GRAY

The George Williams Hooper Foundation for Medical Research, University of California, San Francisco, Calif.

IT seems particularly fitting to discuss here in St. Louis some recent findings on the epidemiology of the encephalitis named for this city and county.

The St. Louis epidemic of 1933¹ was up to that time the largest localized encephalitis epidemic recognized to have occurred in North America. And, only one other epidemic of encephalitis has surpassed it in numbers of cases and deaths—that of the western equine type which occurred in and about North Dakota in 1941.² The St. Louis disaster remains the most important outbreak caused by the St. Louis virus.

Since the virus of western equine encephalomyelitis is responsible for an epidemic infection of man epidemio-

logically closely parallel to that produced by the St. Louis virus, the two will be discussed together. Emphasis, however, will be placed on the St. Louis type.

Now, nine years after the original St. Louis epidemic, we feel that we are able to throw some definite light on two of the remaining unsolved problems: (1) the mode of spread, (2) methods of control. These findings which we present result not from our work alone, but culminate from all the excellent work which has been done previously.

The evolution of the problem can only be reviewed very briefly in order to permit even a sketchy presentation of the new findings. Even so, the details and numerous protocols of the laboratory experiments will have to be presented in a separate paper.

In summing up the epidemiological data at the end of the 1933 epidemic it was reported that either mosquitoes were involved as vectors, or the infection was spread by contact.³ Mosquito

* Presented before the Health Officers Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

Part of a coöperative study by the Hooper Foundation and the Washington State and Yakima County Health Departments. Aided by a grant from the National Foundation for Infantile Paralysis, Inc.

transmission in the laboratory was attempted at that time but failed.³ Some were inclined therefore to believe more strongly in the contact theory. We now understand, however, from a better acquaintance with the behavior of the virus in laboratory animals, why these early attempts at insect transmission were doomed to failure.

Since the original outbreak in St. Louis other encephalitis epidemics have been recognized as predominantly due to this virus,^{4, 5} and there have been mixed St. Louis and western equine outbreaks.^{4, 6-11} It is interesting to note in connection with this that horse infections of both a clinical and an inapparent nature have been produced by inoculation of the St. Louis virus.¹²⁻¹⁴ Similar to findings reported for the equine viruses, and contrary to earlier belief, the St. Louis virus, following a dilute subcutaneous inoculation, has been found readily in the blood of chickens,¹⁵ ducks,¹⁵ doves,¹⁶ horses,¹³ mice,¹⁷ monkeys,¹⁸ guinea pigs,¹⁵ and a rabbit.¹⁵

Antibodies to the St. Louis virus have been found in the serum of normal persons and in those convalescent from encephalitis in many parts of the United States and even in Africa.^{4-11, 19-22} Antibodies have also been demonstrated in the serum of horses and of numerous other vertebrates, both domestic and wild.^{9, 10, 13, 21, 23-26}

From the epidemiological standpoint certain very significant findings have resulted from a recent series of closely correlated field and laboratory studies made in the Yakima Valley, Wash. Both St. Louis and western equine viruses were isolated repeatedly from one species of mosquito, *Culex tarsalis* Coq.^{27, 28} Antibodies to both viruses were found in as high as 50 per cent of apparently healthy domestic fowl in that area^{23, 24} and also in a high proportion of fowl in other areas.^{25, 26, 29} No antibodies, or in some instances a

very significantly lower percentage, were found either in animals from control areas or in laboratory bred fowl.^{24-26, 30, 31} These data again suggested mosquito transmission, and in addition a large inapparent vertebrate reservoir for infection.

Mitamura and associates in Japan had previously claimed mosquito transmission of St. Louis virus by *Culex pipiens* var. *pallens* Coq.³² (This same species of mosquito was found in large numbers during the St. Louis outbreak, although the particular variety was not reported.²) However, others in this country have failed to obtain transmission with *Culex pipiens* Linn.^{3, 33} Recently, using *Culex pipiens* Linn. from California (variety at present not determined) we effected transmission to doves, baby mice, and pigeons.¹⁶ Blatner and Heys, in St. Louis,³⁴ in experiments with the dog tick, *Dermacentor variabilis* (Say), likewise recently proved that arthropod transmission was possible. However, epidemiologically, there has been no particular reason to believe this tick was an important vector during any outbreak. In St. Louis, a late statistical study made by Casey and Broun pointed to mosquitoes as probable vectors.³⁵

Many of you are acquainted with the extensive successful transmission of the western and eastern equine viruses, beginning with the work of Kelser.³⁶ Reviews of these have been presented elsewhere.³⁷⁻³⁹ *Aedes* mosquitoes, the wood tick,⁴⁰ and a cone-nosed bug⁴¹ have all been shown to be potential vectors. Epidemiologically, *Aedes* have always been considered as likely vectors. The evidence is generally held to be strongly against contact transmission for the equine viruses.

In regard to possible contact transmission of either virus there are several significant observations to be considered. Several animals can be readily infected by intranasal instillation of a

suspension of either virus. Infection by feeding however is much more difficult.⁴² St. Louis virus and western equine virus have both been isolated from the nasal washings of horses inoculated by the intracerebral route.^{12, 43} Neither observation has been confirmed yet by other workers and from reported failures it seems probable that the amount of virus present, when detectable, is small. Although attempts have been limited, neither virus has been isolated from nose and throat washings, urine, or feces of man or horse during naturally acquired infections.

From the Yakima Valley studies, reviewed above, in regard to finding antibodies in animals and to isolating viruses from mosquitoes which feed on these animals⁴⁴ and from much supportive laboratory work, we felt justified in forming a hypothesis, for both viruses, of a mosquito-animal-mosquito cycle. Hypothetically, for this area, it seemed likely that mosquitoes became infected principally from animals which fulfilled the following criteria: (1) they should be abundant; (2) they should show no apparent signs of infection, because no epizootic had ever been observed, except in horses and horses were relatively few in number; (3) they should have as a result of a small peripheral inoculation a reasonably large amount of virus circulating in the blood for more than a fleeting period of time; (4) it should theoretically be a bird because in an area where epidemics occur annually the reservoir animal should be one which does not bestow a first season's protection to its offspring by maternal transmission of antibodies, as frequently occurs in mammals. This is because laboratory experience has indicated that very young animals tend to react with higher blood-virus titers than older ones, thus are better potential sources of infection for an insect vector. This advantage would be lost if the animals

were rendered immune for the first few months of life by maternal antibodies. For the Yakima area young domestic fowl best fit all the above criteria of this hypothetical reservoir.

Since all known vertebrate infections have been of short duration and laboratory mosquito infections have been occasionally lifelong, a mosquito which winters in the adult stage, such as *Culex tarsalis* in some areas, might be advanced as a hypothetical vector for the Yakima area. It is found frequently in domestic habitats, feeds readily on domestic fowl, and was found infected in nature.

The question then, was, would this mosquito become both *infected* and *infective* with each of these two viruses as a result of feeding on domestic fowl. Our crucial laboratory experiment was thus outlined. We attempted to reproduce in the laboratory this hypothetical cycle, believed to occur naturally (mosquito-fowl-mosquito). This was not the usual type of laboratory experiment using standard laboratory animals and inoculating by highly artificial routes resulting in characteristic disease patterns and death. Nor did it employ a mosquito readily adapted to a laboratory cage colony. Instead, the animals and mosquitoes suspected were brought into a carefully screened field laboratory in the epidemic area during the epidemic season and only suspected natural routes of infection were used. No deaths or signs of illness were expected in these animals.

To determine the presence of infection in our experimental fowl, since they showed no sign of disease, it was necessary to bleed at the right time following the infective mosquito bite, and test the serum for virus by intracerebral inoculation of mice. We first determined the period during which the viruses could be detected in the blood following subcutaneous inoculation, a route which was our best means of

simulating a mosquito bite. Both viruses were usually demonstrable from about 18 hours after inoculation until 60 to 72 hours. For a single test to determine the presence of virus, 48 hours turned out to be convenient and best suited to both viruses. Further evidence of infection was obtained by making tests for antibodies on the serum drawn 15 days after inoculation. These antibody responses were usually clear-cut, but never accepted as conclusive without previous virus isolation.

The selection of suitable virus strains appeared to be of great importance. Work with the eastern equine virus,⁴⁵ yellow fever virus, and others had previously indicated that any virus which originally had the ability to invade other than neural tissues tended to lose this affinity after repeated direct brain to brain passage. This, of course, is a highly artificial route of infection, one never occurring in nature. We felt that any old "brain fixed" laboratory strain might give misleading results. We therefore used almost exclusively strains of viruses recently isolated from mosquitoes and after not more than 4 passages in the brains of animals (western equine strain F199 and St. Louis strain F103). Both fresh strains of virus had been carefully identified. Using an old laboratory strain of western equine virus delayed and hampered our work with that virus, work which was limited by the shortness of the season during which mosquitoes were available.

We used incubator chicks which were kept in mosquito free quarters for 4 to 8 weeks before use. Mosquitoes were all derived from larvae brought into the laboratory.

The fowl-insect-fowl experiments reported here were performed in a temporary field laboratory in Yakima during the summer of 1942. Virus identifications and isolations from frozen serum and mosquitoes were

carried out in the San Francisco laboratory.

ST. LOUIS VIRUS EXPERIMENTS

Preliminary transmission of the St. Louis virus to chickens by *Culex tarsalis* infected by feeding on a blood-virus suspension had been accomplished in our Texas field laboratory and has been previously reported.⁴⁶

In Yakima the St. Louis virus was repeatedly transmitted by *Culex tarsalis* from chicken to chicken during the course of two experiments. (One protocol is given in Table 1.) This same species infected from a duck transmitted the virus to chickens at various intervals during another experiment. Transmission occurred after an incubation period of 8 to 16 days in the mosquito at a temperature varying between 78° and 90° F. (night and day variation). The humidity was kept relatively constant at 85 per cent. Most transmission tests were begun 10 days after the mosquitoes fed on the infected fowl and no experiment with the St. Louis virus was prolonged over 21 days. All fowls serving as a source of infection had been inoculated subcutaneously 48 hours previously with a dilute suspension of infected mouse or guinea pig brain. In previous experiments under higher incubation temperatures with mosquitoes infected on a blood-virus suspension, incubation periods were occasionally as short as 4 days.

By feeding on blood-virus suspensions we have succeeded in demonstrating transmission, as previously reported, by *Culex pipiens*¹⁶ and by *Culex coronator* Beyer.⁴⁶ More recently, in addition and not previously reported, by *Aedes lateralis* (Meigen), *Aedes taeniorhynchus* (Wiedemann), *Aedes vexans* (Meigen) and *Theobaldia incidens*. Here are potential vectors among three genera of mosquitoes and in addition, as reported by Blattner and Heys,³⁴ a tick, *Dermacentor variabilis*.

WESTERN EQUINE VIRUS EXPERIMENTS

Work with a suitable strain of western equine virus (F199) has been more limited. Repeated transmission has occurred, nevertheless, to chickens and to guinea pigs by *Culex tarsalis* fed on a blood-virus suspension. This occurred after an incubation period of 15 days till the end of the experiments at 30 days. Incubation temperatures were again between 78° and 90° F. In one experiment using a duck as the source of infection, these mosquitoes after 10 to 18 days' incubation transmitted the virus to chickens. Infection has also occurred from *C. tarsalis* fed on guinea pigs in the classical way, with transmission to chickens after 17 and 19 days.

cone-nosed bug, especially during the inter-epidemic periods.

DISCUSSION

Thus, for both the St. Louis virus and the western equine virus the cycle suspected in nature has been reproduced: Since both the fowls and the mosquitoes used are present in large numbers in the epidemic area investigated, and have been demonstrated to be naturally infected, it seems reasonable to conclude that this cycle is a normal and an important one. Man, in contrast to the enormous number of other animals suffering from inapparent infection, appears to be an accidental host.

Caution in generalization is advised

TABLE 1

Experiment No. 17

Transmission of St. Louis Encephalitis Virus by *Culex tarsalis*. Source of Mosquito Infection: Chick No. 70 inoculated subcutaneously 48 hours previously.

Number of Mosquitoes Feeding on Chick No. 70: 53 Holding Temperature: 78°–86° F.

| Days After First Feeding | Number Fed | Experimental Animal | Test for Virus at 48 Hours ¹ | Neutralization Test at 15 Days |
|-----------------------------|---------------|------------------------|---|--------------------------------------|
| 6 | 10 | Chick 72 | negative | weakly positive |
| 8 | 13 | " 74 | positive | positive |
| 10 | 14 | " 84 | positive | positive |
| 12 | 8 | " 85 | positive | positive |
| 14 | 13 | " 88 | positive | positive |
| 16 | 9 | " 93 | positive | negative |

¹ Chicken bled 48 hours after mosquitoes fed and serum tested for presence of virus as indication of transmission.

Among the mosquitoes it was previously considered possible for only *Aedes* to transmit the western equine virus. In addition to demonstrating the vector rôle of a *Culex* we have recently effected transmission of this virus by *Theobaldia incidens* (Thomson). These had been infected by feeding on a blood-virus suspension. Thus, both the genus *Culex* and the genus *Theobaldia* in addition to *Aedes* must be considered as potential vectors for this equine virus. We must also consider the possible rôle played by the tick and the

at this point. Conditions in Yakima—a hot, irrigated, agriculturalized valley region—may not and probably do not represent conditions in some other places, as some of our studies in Texas seem to indicate.³¹ There may be numerous other vectors and of animal hosts suited to their feeding habits.

It now seems very probable that *Culex pipiens* was the important vector during the great St. Louis outbreak. It, too, is a domestic mosquito, feeding frequently on birds. Dr. Lumsden tells us that the distribution of human cases

in the county and the periphery of the city fits satisfactorily with the distribution of a domestic fowl reservoir. *Culex pipiens* and *Culex quinquefasciatus* (Say) were the predominant mosquitoes during the time of the outbreak. Since we have failed repeatedly to effect transmission by *Culex quinquefasciatus* it seems less likely to have been involved.

Because it now appears that the St. Louis virus and the western equine virus (and probably the eastern equine virus) are arthropod-borne we would like to suggest an epidemiological classification for this group of encephalitides—"the arthropod-borne virus encephalitides." This would include in addition to those recognized in this country, the Japanese B encephalitis (mosquito-borne) and the Russian spring-summer encephalitis (tick-borne). This would obviate the confusion now encountered in the use of the terms "epidemic encephalitis" and "infectious encephalitis," terms which do not exclude the von Economo type, rabies, African trypanosomiasis, and others. These other terms seem to serve no useful purpose.

In regard to control, mosquito abatement is possible, as has been repeatedly demonstrated.⁴⁷ The degree of control depends on local conditions, species breeding habits, the intelligence with which a control program is planned and carried out, and on the administrative and financial action taken.

Mosquito bite protection is an individual's responsibility, and even in the presence of severe odds much can be accomplished by means of regulation of working hours, clothing, screening, and the use of insect repellents.

Vaccination for the western equine infection, now tested on a large scale in man, appears to be practical. When and where vaccination is indicated is still a problem to be faced. It is one of definite importance to military per-

sonnel in some areas. It seems probable that a vaccine for the St. Louis virus will eventually be available, but we must depend at present on mosquito control or individual mosquito protection.

SUMMARY AND CONCLUSIONS

Field and laboratory investigations furnished data which gave rise to the hypothesis that in at least one epidemic area both St. Louis and western equine encephalitis were mosquito-borne, and that the source of mosquito infection was a huge inapparent reservoir among vertebrates, particularly domestic fowl. Since both viruses had been found in naturally infected *Culex tarsalis*, this species of mosquito was tested in the laboratory for its ability to acquire infection from fowl, and in turn to transmit it. This reproduction in the laboratory of the suspected natural cycle was effected for both viruses. It appears, therefore, that both types of encephalitis are mosquito-borne and that there probably exists an inapparent animal reservoir. However, other mosquitoes representing three genera and other arthropods are capable of transmitting the infection in the laboratory. In some areas these might serve as vectors, and in this case other vertebrate hosts might be involved as reservoirs. Control apparently should be directed primarily at the arthropod vectors, with human vaccination employed under special circumstances.

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Public Health Problems Concerned in the Disposal of Garbage by Feeding It to Swine*

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THE disposal of garbage has been one of the most difficult of the many sanitary problems faced by municipal administrative officials. The incineration of this material requires a considerable capital investment, reduction has not proved to be a profitable undertaking in most municipalities, and many are not in a position to employ the sanitary fill to advantage. Consequently, a large percentage of American cities have found it necessary to utilize the hog feeding method of disposal.

During the first World War, considerable pressure was brought to bear to increase the feeding of garbage to hogs as a food conservation measure. Already similar efforts are being made in connection with the present emergency. While such efforts are entirely in order and will probably be continued of necessity, it is believed that the public health feature of such a program should not be ignored. For the past several years, the writer has had occasion to study various aspects of this problem and has been called upon from time to time to supply information regarding it to sanitary engineers and other health officials. It now seems worth while to summarize for members of the public health profession and other interested individuals some of the accumulated data.

RELATION OF GARBAGE FEEDING TO HUMAN HEALTH

Unfortunately the practice of feeding uncooked garbage to swine helps to perpetuate one of the most important parasitic diseases of man in the United States. This disease, trichinosis, is more prevalent in this country than anywhere else in the world, and its occurrence is associated to a considerable extent with the above mentioned practice.

During the past five years, studies have been conducted in the National Institute of Health to determine the distribution of the trichina parasite in different population groups. In these studies, diaphragms have been obtained from persons coming to necropsy in 168 hospitals in 37 states, the District of Columbia, and Puerto Rico. To date, material from 5,379 individuals has been examined, of which 15.9 per cent has been positive for the parasite. Many of the positive cases have represented infections with relatively small numbers of larvae and it is probable that some of the individuals involved never suffered any serious effects from their infection. However, a certain percentage had infections of a degree which would probably cause illness, even though such illness might not have been recognized as trichinosis at the time of its occurrence.

On an average, about 400 clinical cases of trichinosis are reported yearly

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to the U. S. Public Health Service. However, about one-third of the states do not require the reporting of the disease and in many others it would appear that the reporting is very casual. Each year there come to the attention of the writer in various ways scores of cases which are not reported to state boards of health. There is good evidence also that many cases of the disease are not properly diagnosed. It is apparent, therefore, that the number of cases of trichinosis on record is in no way representative of the total number which probably occur.

SOURCES OF TRICHINA INFECTION

The trichina parasite, *Trichinella spiralis*, is a small roundworm living as an adult in the small intestine, and sometimes in the large intestine, and as a larva or intermediate form in the voluntary muscles of the same individual. It is found in many carnivorous and omnivorous animals. Most human cases of trichinosis are contracted through the consumption of raw or undercooked pork.

Muscle tissue containing the infective larvae of the parasite is not only infectious for man but is capable also of transmitting infection to swine. As collected, household, hotel, and restaurant garbage usually contains scraps of pork. If this pork carries the live worms, its consumption by swine will result in infection with trichinae. If the scraps happen to have come from a piece of pork which was thoroughly cooked, there is little danger of the transmission of the parasite. However, not all pork scraps recoverable from garbage have been cooked and those which have been cooked may not have had treatment sufficient to destroy the larvae. In a large eastern city, examination of nearly 600 composite 100 gram samples of pork scraps from household garbage revealed trichina infection in 1.5 per cent

of the samples. Even though one-third of the positive samples had been cooked, they contained trichinae which were still alive.

The incidence of the trichina parasite in swine is correlated closely with the type of food on which the animals are maintained and with methods of husbandry. Very extensive surveys have been carried out by the U. S. Bureau of Animal Industry to ascertain the extent of infection in swine. Results of these surveys have been reported yearly first by Hall and then by Schwartz in the annual reports of the chief of that bureau. A summation of the data in these reports indicates that there have been examined through June 30, 1941, approximately 12,000 hogs fed on raw garbage, of which 6.2 per cent were infected, approximately 22,000 so-called grain fed hogs, of which 0.8 per cent were infected, and approximately 2,800 hogs fed on cooked garbage, of which 0.4 per cent were infected. In studies in California¹ in which the hogs examined were traced back to the farm and the type of feed ascertained, infection was found in 6.4 per cent of 1,701 hogs fed on raw garbage, in 0.6 per cent of 1,109 hogs fed on grain plus kitchen scraps, and in 0.4 per cent of 2,436 hogs fed exclusively on grain. These data, and many others which are available, indicate beyond doubt that swine maintained on raw garbage are more frequently and more heavily infected with trichinae than are those given most other kinds of feed. They also indicate that the rat plays only a minor rôle in the transmission of trichinosis to swine for the reason that rats are usually just as prevalent around plants feeding cooked garbage as around those feeding raw garbage. If the rat represented the principal source of transmission of the parasite, one would expect almost as high an incidence in hogs fed on cooked as in those maintained on raw garbage.

EXTENT OF PRACTICE OF GARBAGE FEEDING

It is difficult to secure reliable information concerning the number of persons in the United States feeding garbage to hogs, the number of swine maintained on such feed, and the total tonnage of garbage which is disposed of in this manner. In a survey conducted early in 1940 by the Bureau of Agricultural Economics of the U. S. Department of Agriculture through county agricultural agents,² replies which were received from the majority of the states indicated that the number of feeders annually feeding 100 head or more totaled 2,786. A total of 1,022,000 garbage fed hogs was reported to have been marketed annually by these feeders. The report stated that, if allowance is made for missing data, the total number of garbage fed hogs in the country runs to more than 1,250,000 per year. This would seem to be a very conservative figure since it gives no consideration to hogs produced by the very large number of persons who market less than 100 garbage fed hogs per year.

Early in 1939, the writer³ conducted a survey of municipal garbage disposal methods through questionnaires forwarded to health officers in all cities of 10,000 population and over. Replies were received from 764, or 79.3 per cent, of 964 such cities. These replies indicated that a total of 296 cities disposed of municipal garbage entirely by feeding it to swine, while an additional 107 cities disposed of part of the garbage in this manner. Thus a total of 403, or 52.7 per cent, of the 764 cities replying to the questionnaire disposed of municipally collected garbage in whole or in part by feeding to swine. In only 24 of the 403 cities was the garbage cooked before its consumption by swine. While figures are not available for the country as a whole, it is reasonable to assume that the practice is equally or more extensively preva-

lent among smaller cities and towns.

Available data indicate that the trichinosis morbidity rate is correlated closely with the practice of feeding uncooked garbage to swine. For instance, the Pacific Coast States, which rank second in the number of the cities disposing of garbage by feeding it to swine, have the highest morbidity rate of any section. The New England States, with the next highest morbidity rate, lead all other geographical areas in the number of cities using the hog feeding method of disposal.

VALUE OF GARBAGE AS A HOG FEED

The food value of garbage varies considerably according to the source of the material. Garbage from hotels and restaurants, as well as hospitals and other institutions, has a much greater food value than has material from private homes. The food value of garbage has decreased considerably during the past 10 to 15 years. Formerly a ton of garbage would produce approximately 50 to 60 lbs. of pork but more recently this value has been decreased to 30 to 40 lbs. For instance, the fattening value for hogs of Los Angeles city garbage has decreased from 68 lbs. per ton in 1932 to 31 lbs. per ton in 1939. The beginning of the depression period in 1930 marked a considerable fall in the food value of garbage, a decrease which was probably due to economies effected by the housewife. However, the value has continuously declined and it is probable that other factors, such as wider use of mechanical refrigeration in the home and the increased consumption of canned food, have had considerable influence. Whatever the factors may be, the continued decline in the food value of garbage has resulted in decreasing considerably the margin of profit for the hog feeder and has rendered the business of garbage feeding even more hazardous financially.

In general, garbage fed hogs are not

popular with the meat packers because garbage produces a soft, oily pork. The dressed carcass yield of garbage fed hogs is less, and cured pork and lard from such hogs are inferior in quality to that obtained from grain fed hogs. A considerable number of packers have indicated that condemnations are more frequent in the case of garbage fed hogs. These facts and that of buyer discrimination make it necessary to sell this type of pork at a reduced price. Consequently, most meat packers buy garbage fed hogs only at a discount; this discount averages between \$.50 and \$1.00 per 100 lbs.

COST OF GARBAGE IN RELATION TO RETURNS

The decreasing food value of garbage, packer discrimination, and price discounts are of direct concern to the garbage feeder. Unless he is able to secure quality garbage gratis or at a low figure, he is operating under distinct handicaps which at best allow only a slight margin of profit. Many hog feeders secure garbage gratis while others pay varying prices for both household and hotel and restaurant garbage. In a few places the city pays the hog feeder for the collection and disposal of the garbage. Practices in regard to charging for this refuse material vary considerably and depend somewhat on the quality or food value of the material. In some places a fixed price is asked while in other cities the cost is in relation to the market price of corn. For instance, in St. Louis, where the city sells a considerable quantity of municipally collected garbage to hog feeders, the price has ranged from \$.60 to \$1.20 per ton, depending on the price of corn. In Portland, Ore., the competition among garbage feeders for good quality garbage has resulted in prices as high as \$6.00 per ton. Obviously, the higher the price paid for the garbage, the fewer opportunities for profit there are for the feeder.

DISEASES ENCOUNTERED IN GARBAGE FED HOGS

Diseases other than trichinosis are transmitted through garbage, and the frequent occurrence of these diseases contributes to the financial hazards involved in the feeding of raw garbage to hogs. Among these diseases are hog cholera, swine erysipelas, foot and mouth disease, tuberculosis, vesicular stomatitis, and vesicular exanthema. Hog cholera is a particular scourge of garbage fed swine and many outbreaks are due to the transmission of the virus in scraps of pork in the garbage. In fact, Canada requires the cooking of garbage before its consumption by swine as a means of controlling this disease. Vesicular exanthema first appeared in garbage fed hogs in California in 1932; since that time it has occurred intermittently, each time in increasing scope, until it has become a formidable problem because of extensive monetary losses resulting from the high mortality in young pigs.

COOKING OF GARBAGE AS A MEANS OF DISEASE PREVENTION

The heat treatment of garbage in a manner sufficient to destroy viruses, bacteria, or worm larvae contained in parts thereof would seem to offer a solution to the control of many of the diseases transmitted by this material. Consequently, the cooking of garbage offers distinct advantages to the feeder.

The cooking of garbage before its consumption by swine would not completely solve the trichinosis problem because other factors enter into the transmission of the disease. However, because garbage fed hogs are on the average more frequently infected and more heavily infected with trichinae than are those maintained on most other kinds of food, the method would contribute to a considerable extent to the control of human trichinosis.

The frequent warning of the public to cook pork well has apparently been

unsuccessful in controlling this disease, since there is no evidence to indicate a reduction in the number of clinical cases over the period in which intermittent warnings have been given. The present situation warrants the application of control procedures other than a dependence on the individual to protect himself against the disease, since public health practices are far beyond the antiquated stage wherein personal responsibility is the sole guide to disease prevention.

As previously stated, Canada requires the cooking of garbage as a measure of protection against hog cholera. In England cooking regulations are in force as a means of preventing foot and mouth disease. There have been few outbreaks of human trichinosis in Canada and, until the past year, England has been particularly free of the disease. According to one authority, the occurrence of a relatively large number of cases in England recently has been associated with a wartime relaxation in the enforcement of the regulations. In the United States, Oregon and Kentucky have regulations pertaining to the cooking of garbage before its consumption by swine. In Oregon, the regulations are administered by the State Department of Agriculture, and in Kentucky by the State Department of Health. Legislation to this end has recently been enacted in New York State. A rather exhaustive inquiry into the situation in that state was made by the New York State Trichinosis Commission.⁴⁻⁵ Following the work of the commission, several pieces of legislation having a bearing on trichinosis control were enacted. These included a measure to regulate slaughter-houses, a provision for the processing for the destruction of trichinae of pork products customarily eaten without cooking by the consumer, and a bill requiring that any contract made or permit issued by a municipal corporation or any public or private institution for the disposal of

garbage shall require proper cooking of the material before it is used as a feed for swine.

Contacts with state officials and a personal survey of the situation in the two first mentioned states have led the writer to believe that little opposition has been encountered in the enforcement of the regulations and that for the most part garbage feeders have voluntarily complied with the requirements and are not dissatisfied with them. In interviews with feeders in these states, they have raised none of the objections commonly offered by individuals who have never tried the feeding of cooked garbage.

OBJECTIONS TO COOKING GARBAGE FOR HOGS

The objections to feeding cooked garbage generally come under five categories, viz.: lack of palatability, presence of injurious acids and alkalis, toxicity of citrus rinds, absence of free choice selection of food, and failure of the hogs to make adequate gains. While we have no way of measuring the gustatory preferences of a hog other than its acceptance or rejection of food, the fact that hogs do consume cooked garbage with apparent relish is in itself an answer to the argument that the cooked material lacks palatability. There is also no evidence that the cooking of garbage releases dangerous acids and alkalis not already in available form. Cooking may, however, distribute such substances throughout the material. Unless in strong concentration, the dilution of such substances by the customary addition of a large amount of water to garbage is such as to render them usually innocuous.

A frequently expressed objection to the cooking of garbage has dealt with the supposition that the cooking of citrus fruit rinds releases a poison dangerous to hogs. However, experi-

mental evidence⁶ indicates that, although they have very little food value, the cooking of the rinds results in no toxic effects.

More or less free choice selection of food material is offered when hogs are maintained on raw garbage. When the material is cooked, the animal is of course not privileged to separate out types of food not to its liking. This is a valid objection, although the ability of the animal to follow its predilections may not necessarily be correlated directly with the nutritive value of the food selected. In fact, it has been the experience of many feeders that the use of cooked garbage is more economical, since a greater portion of the material is consumed and there is much less waste.

Some feeders have reported in the past that hogs fail to make adequate gains on cooked garbage. Unfortunately most opinions of this sort are based on limited observation and are

not supported by evidence from carefully planned and executed experiments in which adequate controls have been employed. However, it is probably true that the prolonged heating of garbage at high temperatures does break down or destroy some of the nutritive elements in the material. Little is known concerning the changes brought about in garbage heated to various temperatures and under various conditions, and more experimental work is needed on this problem. In spite of the lack of knowledge on the subject, there may be offered as evidence the opinion of many of those who have fed cooked garbage to swine and who believe that advantages are to be derived from cooking the material. A majority of the feeders interviewed by the writer stated that hogs maintained on cooked garbage averaged 1 to 1½ lbs. gain per day, which is certainly a good rate of gain. Some of these individuals fed grain supplements in addition to

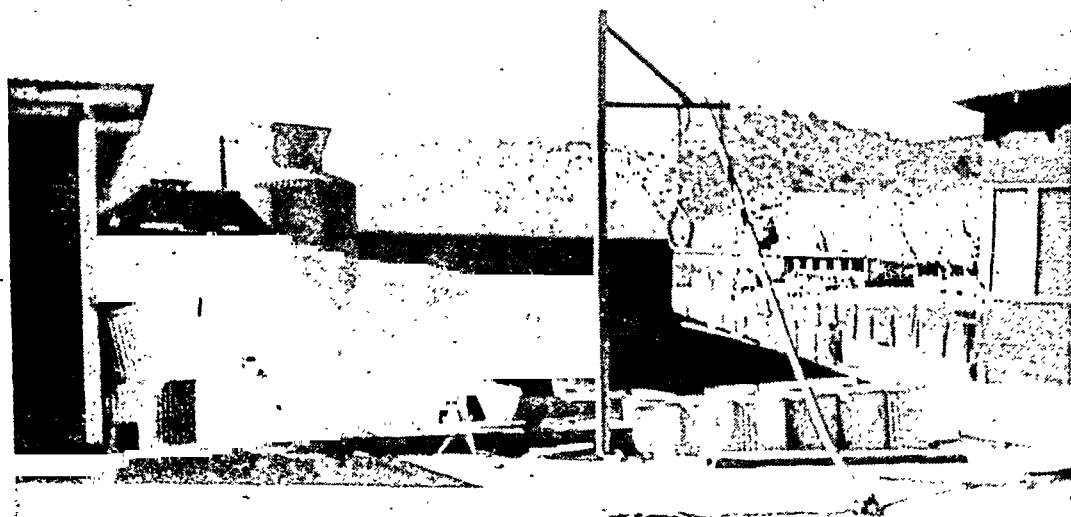


FIGURE 1—Second-hand rendering tank used for the steam cooking of garbage at the U. S. Marine Hospital, Fort Stanton, N. M.

garbage but some fed only cooked garbage.

METHODS OF PROCESSING GARBAGE

Garbage can be processed in various ways as a means of preventing disease transmission. The most practical treatment consists in boiling the material after the addition of water. This is probably the simplest and most inexpensive method of heat treatment available. In small operations, it can be accomplished by the use of equipment usually at hand or easily and inexpensively devised (Figure 1). In large scale feeding operations, equipment for boiling has not been difficult to provide and usually costs less than that needed for heat treatment by other methods. The suggested sanitation code of the U. S. Public Health Service specifies the holding of garbage to a boiling point for at least 30 minutes as a means of preventing the transmission of trichinosis. It would appear also that the transmission of many swine diseases could be obviated by this amount of heat treatment. The relative effect of the nutritive value of the material boiled for this period of time compared to that cooked for longer periods is not known. However, the experience of some hog feeders would seem to indicate that garbage boiled for long periods has less feeding value.

Various other methods have been devised for the treatment of garbage so that it may be used as a food for swine without danger of the transmission of disease. These methods involve the use of special processes which require more or less elaborate machinery and which would probably be suitable only for large scale feeding operations. However, the principles involved are interesting ones and may be capable of development to a point of practical and less expensive application.

One of these processes consists of a revolving cylinder provided between the

outer surface and the inner container with a steel jacket through which superheated air is blown by forced draft. The amount of heat applied to the garbage is controlled through escape of vapor, through the constant rotation and agitation of the material, and through the regulation of its depth over areas of varying temperature. It is possible by this process to decrease materially the moisture content of the garbage. The estimated cost of dehydrating garbage by this process varies between \$2.75 and \$3.25 per ton, depending on the scale of operation. This figure includes no allowance for labor, insurance, or interest on the money invested.

Another process which has been recommended for the dehydration of garbage and its conversion into a feed for livestock consists of a cylindrical dryer with a steam jacket surrounding the internal chamber containing the material (Figure 2). Paddles within the chamber provide a constant agitation of the material during the heating process. Chemical treatment is carried out to promote hydrolysis and steam is then applied until a pressure of 100 lbs. has been obtained. This pressure is maintained for 10 minutes, after which dehydration is accomplished by the introduction of varying amounts of vacuum in the inner chamber and a gradual lowering of the steam pressure in the outer chamber. The process is so arranged that suitable proportions of grain can be introduced through a special vacuum valve arrangement to be mixed with the garbage and provide a balanced ration. It has been estimated that the cost of treating a ton of garbage by this method amounts to approximately \$1.65. Another quite similar process, without provision for chemical treatment, has also been devised.

Of the several methods of processing garbage, experiments carried out at

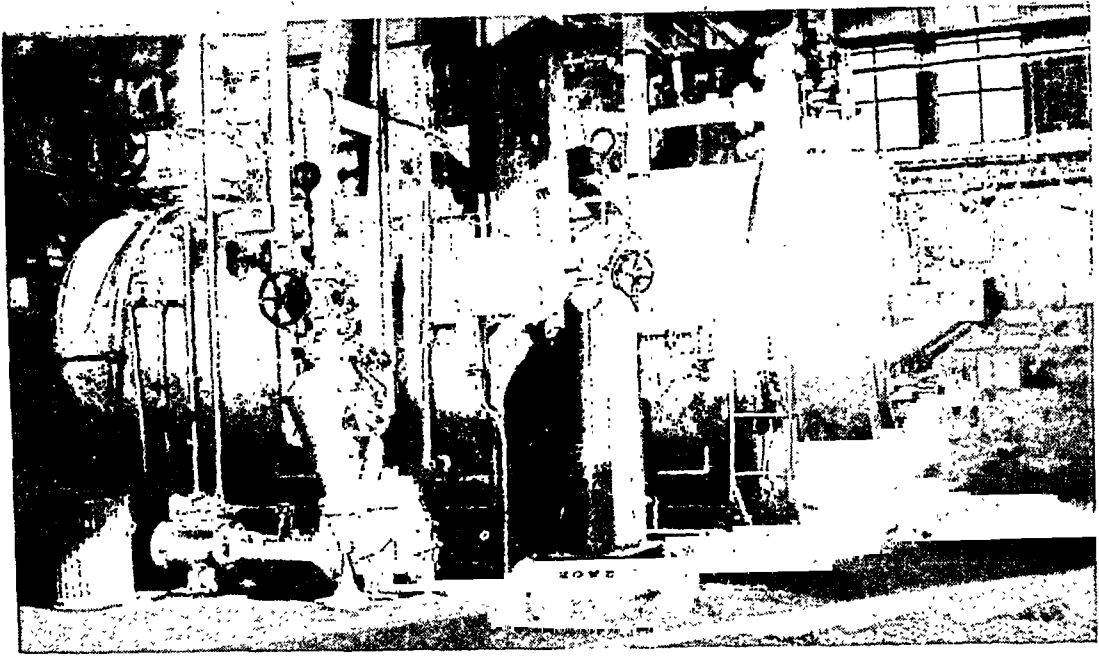


FIGURE 2—Apparatus employed for the steam-vacuum dehydration of garbage and its conversion into a feed for livestock

Courtesy American Process Feed Co., San Diego, Calif.

the California Agricultural Experiment Station under the direction of Prof. E. H. Hughes indicated that the simple heat treatment of garbage by the introduction of steam to an open container was most satisfactory from the standpoint of the food value of the product. Hogs maintained on garbage cooked in this way made better gains than did those fed the dehydrated material. Furthermore, in the feeding trials there was very little difference between the average daily gain of hogs fed on the open steam cooked garbage and raw garbage collected from the same source.

The above mentioned experiments, which are as yet unpublished, confirm the impression of the writer gathered as a result of visits to numerous garbage feeding plants and of interviews with individuals who have been feeding cooked garbage to hogs, in some cases over a long period of years. On a recent tour of such plants in a state in which there were promulgated two years ago regulations requiring the

cooking of garbage before its consumption by swine, all feeders interviewed stated that they would not return to the feeding of uncooked garbage even though the regulations were revoked. One individual who cooks and feeds 42,000 lbs. of garbage per day without the addition of any supplements advised the writer that the superiority of cooked garbage over raw garbage is so great that he considers the authorities did him a great favor in requiring him to cook the product. He stated that the cost of cooking would be more than compensated for by the extra feeding value of the cooked garbage, even though the grease salvaged from the cooked material more than covered the cost of operation. Losses had also been reduced materially since the product had been cooked. Another prominent livestock producer, who had threatened court action rather than cook garbage for hogs, later thanked the authorities for enforcing regulations and stated that he would never revert to the feeding of the raw material.

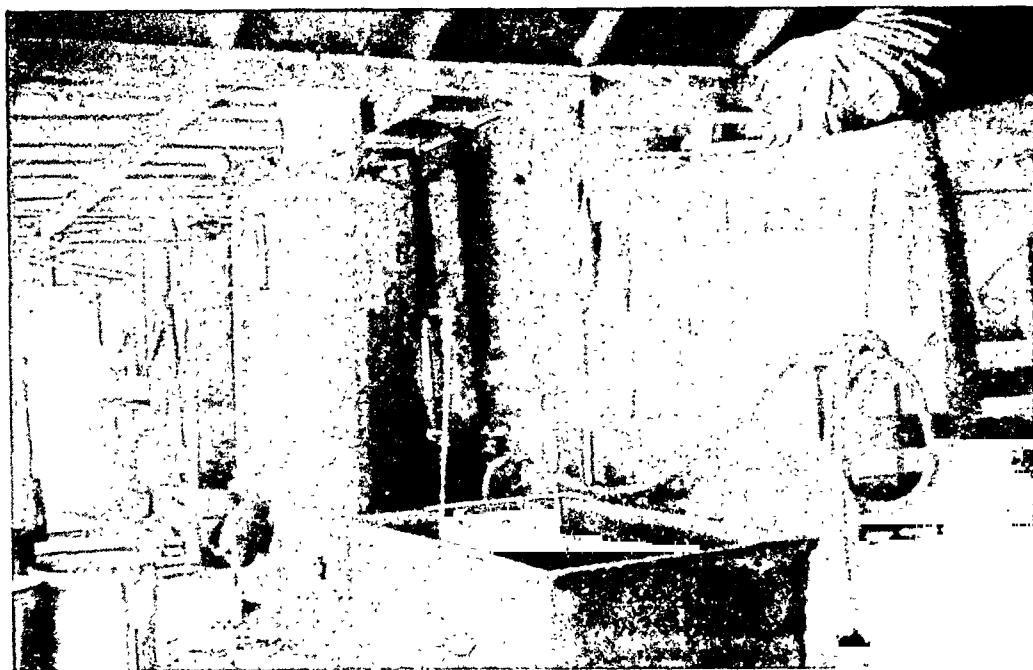


FIGURE 3—Boiler and one of the cooking tanks employed for the steam cooking of garbage for 300 hogs

COST OF EQUIPMENT FOR PROCESSING GARBAGE

The expense of installing equipment for the heat treatment of garbage varies considerably in accordance with the method of cooking, the number of hogs to be fed, the simplicity or elaborateness of the equipment, the type of fuel to be employed, and other factors. For instance, some feeders use oil burning equipment or automatic stokers which represent greater initial capital outlays but which probably pay for themselves in the long run in the saving of wages. The outlay for equipment used in the special processes mentioned above would run into thousands of dollars and would be warranted only for large scale operations. For open kettle steam cooking or direct open flame cooking, elaborate or costly equipment is not necessary and most feeders improvise equipment from discarded or second-hand materials. In order to give some practical idea as to the cost

of cooking equipment, the following is summarized from information obtained from representative feeders at the time of inspection of their operations.

F. P. On an average feeds 100 hogs; supplements garbage with grain. Collects and cooks approximately 3,750 lbs. of garbage per day. A 15 h.p. boiler and automatic stoker cost \$500 four years ago. A 500 gal. steel cooking tank cost \$20 second-hand. This is a closed tank and the garbage is cooked under steam pressure. This individual has been feeding cooked garbage for 31 years.

C. E. Maintains about 300 hogs on an average. Collects and cooks about 4,000 lbs. of garbage per day. Uses a 20 h.p. boiler (Figure 3) which cost \$400 new, and 2 steel cooking tanks which cost \$50 each new. A single steam line is run across the bottom of each tank. Each cooking tank holds 340 gal. Supplements cooked garbage with grain.

H. B. Maintains on an average about 200 hogs. Collects and cooks 4,500 lbs. of garbage per day. Pays \$1,000 per year for garbage. Uses a 10 h.p. tubular boiler which cost \$300, and an 800 gal. steel cooking tank which cost \$69.50. Steam lines are run across bottom of tank. Supplements cooked garbage with distillery waste.

B. B. Feeds on an average of 1,500 hogs. Cooked garbage is supplemented with an average of 1.5 lbs. of grain per head per day. Collects and cooks approximately 11,000 lbs. of garbage per day. The equipment consists of a 20 h.p. boiler, 2 steel cooking vats, one of 2,800 gal. and the other of 1,260 gal. capacity, and a grease vat holding 360 gal. This equipment, together with necessary feed troughs and chutes for delivering garbage cost \$1,575 installed.

B. and N. Feed an average of 2,000 hogs on cooked garbage only. Collect and cook about 21 tons of garbage per day. Equipment (Figure 4) consists of a 42 h.p. high pressure boiler, 2 steel cooking vats, one of 2,880 gal. capacity and the other of 2,231 gal. capacity, a cooling vat holding 1,260 gal., a grease vat holding 619 gal., and a storage and cooling vat holding 2,430 gal. This equipment, including necessary chutes and feeding troughs, cost \$3,278 installed.

C. J. Maintains about 12 hogs on an average. Cooks in two 50 gal. (Figure 5) oil drums, each set in a brick furnace. The oil drums and brick for the furnace were salvaged from the city dump and represent no cash outlay. Fuel consists of packing boxes and crates salvaged from the dump.

D. B. Feeds on an average of 500 hogs; supplements cooked garbage with grain approximately 2 lbs. per day per hog. Cooks and feeds 4,000 lbs. of garbage per day. Uses two 1,000 gal. steel tanks which cost \$80 each. Steam lines are run across bottom of tanks. Boiler cost \$600.

G. B. Maintains about 800 hogs on an average. Cooking equipment consists of two 2,550 gal. Douglas fir cooking vats which cost \$70 each. A marine boiler and piping cost \$500. The steam pipes are placed over the bottom and around the sides of the tanks. Supplements cooked garbage with grain at rate of 1.5 lbs. per hog per day.

Most of these observations were made and recorded prior to our active participation in the war. The situation in regard to the availability of equipment for the treatment of garbage has changed materially and it is not possible to predict whether materials will be obtainable for this purpose. No doubt the advantages of the practice from a public health standpoint will have to be weighed against the neces-

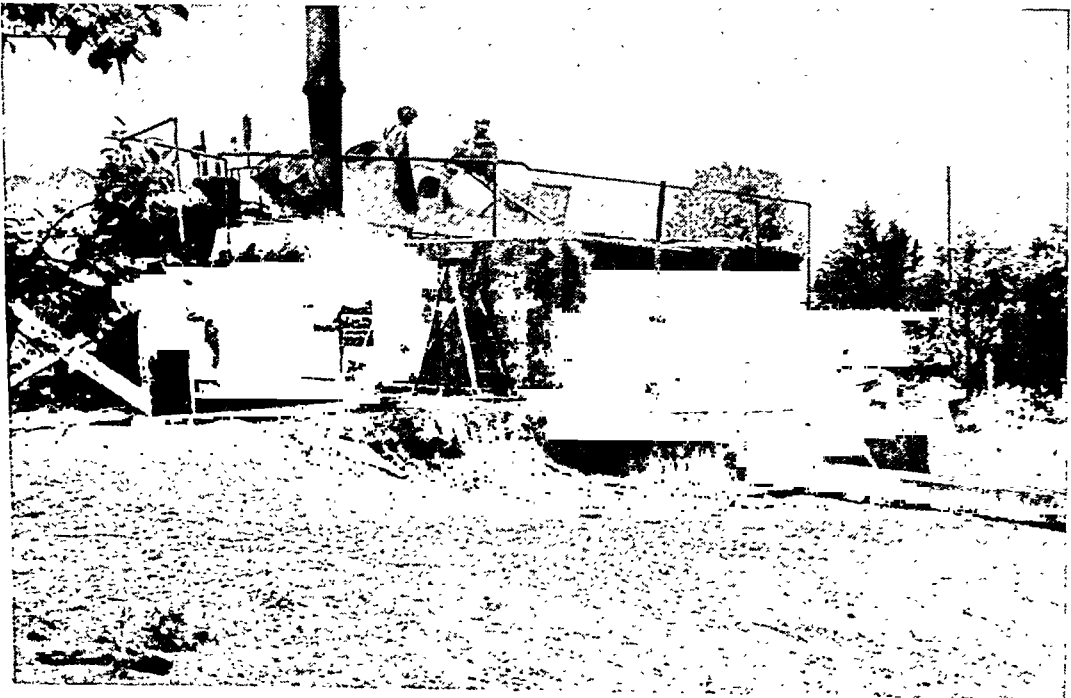


FIGURE 4—Apparatus used for the steam cooking of garbage for 2,000 hogs

sity for conserving metals for war purposes. The matter has been placed tentatively before the War Production Board and sooner or later a policy will be formulated. However, no change in the situation has taken place in other war countries, and regulations covering the cooking of garbage are still in force in Canada and England.

COST OF OPERATION

Accurate figures on the cost of cooking garbage are very difficult to obtain for the reason that most feeders do not maintain bookkeeping systems and can only estimate costs. Effort has been made by the writer to ascertain from all feeders interviewed some idea as to the cost of operating cooking equipment. The estimates furnished vary considerably, depending on the method of cooking, the section of the country, local wage scales, cost of fuel, manner of handling, and the extent to which

inedible material is removed by hand sorting either before or after cooking. Furthermore, in some of the places visited, some of the labor was furnished by the family of the feeder, in which event it was not taken into consideration in estimating costs.

Figures obtained by the writer indicate that the cost of cooking garbage varies from \$1.45 to \$3.50 per ton on the West Coast and from \$.40 to \$1.95 per ton in the South. These figures represent only the cost of labor and fuel and do not include such items as interest on the investment, depreciation; insurance, etc. In general, the cost decreases somewhat in proportion to the number of hogs fed. Information furnished the writer by Dr. Benjamin Schwartz of the U. S. Bureau of Animal Industry indicates that the cost of cooking in Canada with installations sufficient to cook garbage for 150 hogs is around \$.90 per ton.



FIGURE 5—Two 50 gallon oil drums converted for cooking of garbage over an open flame

SANITATION OF GARBAGE FEEDING
PLANTS

The general sanitation of garbage feeding plants has some bearing on the transmission of trichinosis as well as of endemic typhus and plague. These plants provide an abundance of food material for rats, and rats are usually prevalent around such plants unless proper construction is employed and suitable measures are taken to limit their spread. While the rat is of only minor importance in the transmission of trichinosis to swine, hogs do occasionally eat rats and may thus acquire trichinosis in this way.

At best the feeding of garbage to hogs creates something of a nuisance and sanitary conditions may become exceedingly bad unless constant effort is made to maintain the premises in good condition. It is best to have hog feeding plants situated in an area reasonably far removed from residential sections and preferably on land which has sufficient fall and enough natural drainage to prevent the accumulation of standing water and mud holes. Sandy soil is more suitable than heavy clay soil.

Feeding platforms should be constructed of concrete with sufficient fall to allow proper drainage into a gutter of a depth sufficient to hold the run-off of waste and wash water. The writer believes that such feeding platforms should be raised above the ground, but in any event each platform should have a rat guard of galvanized iron sheeting or concrete extending 18 in. into the subsoil. Edges of feeding platforms should extend upward at least 6 in. in order to avoid spilling garbage onto the surrounding ground area. Feeding and watering troughs should be likewise constructed of concrete with a surrounding width of concrete platform with gutters to prevent spilling. Bins for bones, tin cans, bottles and other objects salvaged from the garbage should

be constructed at least 2 ft. above ground and properly rat proofed. Bones removed from cooked garbage provide less of a nuisance than those in raw garbage. After the meat has been cooked from the bones, they bleach rapidly after being binned and usually cause no odor or fly problem.

Feeding platforms and troughs should be cleaned and washed down at least once a day and all inedible materials removed in order to maintain cleanliness and minimize fly breeding. Large scale operations should only be permitted to be carried on where the owner has sufficient land that feed lots can be changed frequently so that old lots can be turned over and if possible seeded to cover crops.

The garbage feeding plant is a focus for the potential spread of endemic typhus, plague, and trichinosis, and as such warrants supervision by local health departments. A few health jurisdictions have regulations governing the operation of such plants. In Los Angeles County, Calif., the County Live Stock Department maintains close supervision over garbage feeding plants. From the standpoint of promoting rat control and general sanitation, construction plans issued by this department are the best the writer has seen.

SUMMARY

It is pointed out that the widely prevailing practice of disposing of garbage by feeding it to swine provides an important avenue of infection for human trichinosis and a potential hazard for the spread of endemic typhus and plague. The cooking of garbage before its consumption by swine constitutes an important step in the control of human trichinosis. Objections on the part of hog feeders to this practice are discussed and evidence is offered to indicate that many feeders who now cook garbage find it feasible and economical to do so. Information is given on

methods of processing garbage and types of equipment now in use in various places. Data obtained from hog feeders on cost and operation of equipment is furnished for the benefit of sanitary engineers and others who may have occasion to deal with this problem.

NOTE: Information contained in this paper has been obtained from a wide variety of sources and the writer is indebted to those persons who have coöperated in furnishing it. Particularly is he grateful for the assistance accorded by the following individuals and organizations: Dr. A. T. McCormack, Kentucky State Health Commissioner; Mrs. Sarah Vance Dugan, Director, Bureau of Foods, Drugs, and Hotels, Kentucky State Department of Health; Dr. C. H. Blandford, Hardin County Health Officer, Elizabethtown, Ky.; M. M. Warren, Jefferson County Board of Health, Louisville, Ky.; R. E. Boyle, Manager, Fontana Farms, Fontana, Calif.; Professor E. H. Hughes, University of Cali-

fornia, College of Agriculture, Davis, Calif.; W. E. Upshaw and E. H. Jefferson, Oregon State Department of Agriculture, Portland, Ore.; the Institute of American Meat Packers, Chicago, Ill.; and J. M. Princell and Lawrence Oliver, American Process Feed Co., San Diego, Calif.

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Age and Sex as Factors in the Development of the Typhoid Carrier State, and a Method for Estimating Carrier Prevalence*

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AS a result of improvements in environmental sanitation, chronic typhoid carriers have assumed greater relative importance as sources of infection. Changes in typhoid incidence will probably bear a direct relationship to the prevalence of typhoid carriers, so it is of interest to estimate the current and future prevalence of these carriers. Age and sex are believed to be factors of importance in the pathogenesis of the carrier state and will be treated in this paper.

A. CHRONIC CARRIERS

Klinger¹ noted marked differences in the age distribution of what he defined as temporary and chronic carriers. The temporary carriers were predominantly children, the curve of carriers by age paralleling the curve of typhoid cases by age. Chronic carriers were rarely found among children; they were most frequently found among middle-aged adults. Stokes and Clarke,² Dean,³ Lentz,⁴ and Ledingham and Arkwright⁵ also pointed out the marked pre-

ponderance of adults, particularly adult females, among chronic carriers. Möller⁶ studied 64 chronic carriers among 7,125 recovered cases, noting that 45 were adult females, 16 were adult males, and only 3 were children. The rate of development of the carrier state in the childhood group was 0.1 per cent as contrasted with 13.5 per cent among adults. Hedrich⁷ analyzed the records of approximately 10,000 recovered cases of typhoid fever occurring in New York City between 1916 and 1926. One hundred and seventy-five of these persons had positive stools six months or longer after recovery. The observed rate of development of the carrier state among females was more than twice that among males. Moreover, the probability of developing the carrier state increased sharply with age, being about ten times as high at age 50 as at age 20.

On the other hand, Havens and Dehler⁸ attempted to determine whether typhoid carrier genesis varied with age or sex and decided that there were no differences. Similarly, Bigelow and Anderson,⁹ as a result of their studies in Massachusetts, concluded that sex differences disappeared when they

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considered only carriers who were derived from convalescent cases.

The records of the New York State Department of Health cover a little more than 10 years' experience relative to fecal release specimens from typhoid fever convalescents. Prior to 1929 release specimens were not required except from individuals regularly engaged in food handling occupations. The Sanitary Code was then amended, effective November 1, 1929, requiring that convalescent typhoid patients submit at least two successive negative specimens of feces before being released from supervision. The specimens must be passed not less than 3 weeks from the date of onset and at an interval of not less than 5 days. Cases among persons regularly engaged in food handling occupations are not released until they submit four successive negative specimens of feces, passed in the manner described. The Code defines a chronic fecal typhoid carrier as one whose feces contain typhoid bacilli, but who does not give a history of typhoid fever within the preceding year. By authority of these two regulations, then, fecal specimens are obtained from all individuals with typhoid fever until the requirements for release are met or until it is determined that the chronic carrier state exists.

Between January 1, 1930, and December 31, 1939, there were 3,750 cases and 433 deaths from typhoid fever reported in New York State, exclusive of New York City and state institutions. This represents a case fatality rate of 11.5 per cent, which indicates that reporting was quite complete. With the exception of 620 cases, all were followed for a sufficient length of time to determine their status according to the foregoing definitions. There were 25 who did not submit a sufficient number of specimens for release because they were not effectively followed up; 142 others who absconded or left New York State before submitting proper release specimens; and 453 who died in the attack of typhoid fever or within 1 year of the illness.

It is generally stated that 2 to 4 per cent of typhoid cases become chronic carriers. Among the 3,130 cases comprising this series, 90, or 2.9 per cent, became chronic carriers.

The rôle played by age in the development of the carrier state is shown in Table 1. Although almost half (48.9 per cent) of the typhoid cases were under 20 years of age, only 5.5 per cent of the carriers resulted from these particular cases. It appears that the probability of becoming a carrier is negligible (0.3 per cent) if typhoid is

TABLE 1
Typhoid Cases and Resulting Chronic Carriers by Age*
New York State, Exclusive of New York City and State Institutions
1930-1939

| Age at Time of Typhoid | Number | | Per cent of Total | | Per cent Cases Resulting in Carriers |
|------------------------------|--------|----------|-------------------|----------|--|
| | Cases | Carriers | Cases | Carriers | |
| Under 10 | 628 | 2 | 20.1 | 2.2 | 0.3 |
| 10-19 | 902 | 3 | 28.8 | 3.3 | 0.3 |
| 20-29 | 579 | 12 | 18.5 | 13.3 | 2.1 |
| 30-39 | 409 | 18 | 13.1 | 20.0 | 4.4 |
| 40-49 | 295 | 26 | 9.4 | 28.9 | 8.8 |
| 50-59 | 188 | 19 | 6.0 | 21.1 | 10.1 |
| 60 and over | 129 | 10 | 4.1 | 11.1 | 7.8 |
| All ages | 3,130 | 90 | 100.0 | 100.0 | 2.9 |

* Includes only those typhoid cases from whom a sufficient number of fecal specimens were obtained to determine carrier status.

contracted while one is less than 20 years of age. This probability increases with advancing age, reaching a maximum of 10.1 per cent among cases in the 50-59 age group.

From Table 2 it will be noted that females make up only 44.3 per cent of the cases, but comprise 58.9 per cent of the carriers. The rate of development of the carrier state at all ages is almost twice as high for females as for males. The most striking sex difference in the age-specific carrier rates occurs in the 40-49 age group in which 16.4 per cent of the female cases and only 3.5 per cent of the male cases resulted in the chronic carrier state.

disease. Cases were entered into the table as of the week in which their first fecal specimen was submitted for examination.

Certain assumptions were necessary because specimens were not submitted from all patients every week. When typhoid bacilli were found in two successive specimens submitted with more than 1 week interval, it was assumed that intervening specimens would also have been positive. Likewise, while realizing the possibility of intermittency of the carrier state, two negative specimens were considered to represent the state of affairs for all weeks between the two negative examinations. When a positive

TABLE 2

Typhoid Cases and Resulting Chronic Carriers by Age and Sex*
New York State, Exclusive of New York City and State Institutions
 1930-1939

| Age at Time of Typhoid | Number | | | | Per cent of Total | | | | Per cent Cases Resulting in Carriers | |
|------------------------------|--------|--------|----------|--------|-------------------|--------|----------|--------|--|--------|
| | Cases | | Carriers | | Cases | | Carriers | | | |
| | Male | Female | Male | Female | Male | Female | Male | Female | Male | Female |
| Under 10 | 347 | 281 | 2 | .. | 11.1 | 9.0 | 2.2 | ... | 0.6 | ... |
| 10-19 | 491 | 411 | 2 | 1 | 15.7 | 13.1 | 2.2 | 1.1 | 0.4 | 0.2 |
| 20-29 | 341 | 238 | 7 | 5 | 10.9 | 7.6 | 7.8 | 5.6 | 2.1 | 2.1 |
| 30-39 | 216 | 193 | 6 | 12 | 6.9 | 6.2 | 6.7 | 13.3 | 2.8 | 6.2 |
| 40-49 | 173 | 122 | 6 | 20 | 5.5 | 3.9 | 6.7 | 22.2 | 3.5 | 16.4 |
| 50-59 | 110 | 78 | 10 | 9 | 3.5 | 2.5 | 11.1 | 10.0 | 9.1 | 11.5 |
| 60 and over | 65 | 64 | 4 | 6 | 2.1 | 2.0 | 4.4 | 6.7 | 6.2 | 9.4 |
| All ages | 1,743 | 1,387 | 37 | 53 | 55.7 | 44.3 | 41.1 | 58.9 | 2.1 | 3.8 |
| Total | 3,130 | | 90 | | 100.0 | | 100.0 | | 2.9 | |

* Includes only those typhoid cases from whom a sufficient number of fecal specimens were obtained to determine carrier status.

B. CONVALESCENT CARRIERS

When these marked age and sex differences among chronic carriers were noted, it was considered desirable to study the relation of these two factors to the average frequency with which typhoid bacilli could be isolated from the feces of convalescent patients. Few such studies are reported in the literature.^{3, 9-12} The results of stool cultures for 374 cases reported during 1938 and 1939 were tabulated by sex, broad age groups, and by week after onset of the

was followed a few weeks later by a negative, with no intervening examination, it was assumed that the feces were positive for the first half of the interval and negative for the latter half. The reverse assumption was made when a negative was followed by a positive. No such assumptions were necessary, however, during the first 4 weeks following onset, and in this period the trend of the curve is definitely established.

As seen in Table 3, approximately 61 per cent of the specimens submitted

TABLE 3

Percentage of Typhoid Fever Cases Discharging Typhoid Bacilli in Their Feces by Age and Week After Onset, Based upon 374 Typhoid Cases Reported During 1938-1939 New York State, Exclusive of New York City

| Weeks from Onset to Examination | Under 30 Years | | | 30 Years and Over | | | All Ages | | |
|---------------------------------|----------------|-----------------|-------------------|-------------------|-----------------|-------------------|--------------|-----------------|-------------------|
| | Number Cases | Number Positive | Per cent Positive | Number Cases | Number Positive | Per cent Positive | Number Cases | Number Positive | Per cent Positive |
| Less than 1 | 40 | 24 | 60.0 | 24 | 15 | 62.5 | 64 | 39 | 60.9 |
| 1 | 108 | 71 | 65.7 | 46 | 35 | 76.1 | 154 | 106 | 68.8 |
| 2 | 125 | 80 | 64.0 | 64 | 42 | 65.6 | 189 | 122 | 64.6 |
| 3 | 159 | 73 | 45.9 | 78 | 41 | 52.6 | 237 | 114 | 48.1 |
| 4 | 193 | 48 | 24.9 | 88 | 38 | 43.2 | 281 | 86 | 30.6 |
| 5 | 211 | 34 | 16.1 | 105 | 33 | 31.4 | 316 | 67 | 21.2 |
| 6 | 222 | 19 | 8.6 | 109 | 27 | 24.8 | 331 | 46 | 13.9 |
| 7 | 232 | 14 | 6.0 | 116 | 25 | 21.6 | 348 | 39 | 11.2 |
| 8 | 236 | 12 | 5.1 | 119 | 23 | 19.3 | 355 | 35 | 9.9 |
| 9 | 237 | 5 | 2.1 | 121 | 21 | 17.4 | 358 | 26 | 7.3 |
| 10 | 239 | 8 | 3.3 | 124 | 19 | 15.3 | 363 | 27 | 7.4 |
| 11 | 239 | 4 | 1.7 | 127 | 15 | 11.8 | 366 | 19 | 5.2 |
| 12 | 243 | 3 | 1.2 | 129 | 13 | 10.1 | 372 | 16 | 4.3 |
| 13 | 244 | 3 | 1.2 | 129 | 13 | 10.1 | 373 | 16 | 4.3 |
| 14 | 244 | 3 | 1.2 | 130 | 11 | 8.5 | 374 | 14 | 3.7 |
| 15 | 244 | 3 | 1.2 | 130 | 12 | 9.2 | 374 | 15 | 4.0 |
| 16 | 244 | 2 | 0.8 | 130 | 11 | 8.5 | 374 | 13 | 3.5 |
| 17 | 244 | 2 | 0.8 | 130 | 12 | 9.2 | 374 | 14 | 3.7 |
| 18 | 244 | 2 | 0.8 | 129 | 10 | 7.8 | 373 | 12 | 3.2 |
| 19 and over | 244 | 2 | 0.8 | 130 | 10* | 7.7† | 374 | 12* | 3.2† |

* One female, over 30 years of age, became negative in the 42nd week.

† Per cent persons over 30 declared chronic carriers was 6.9; and for all ages, the percentage was 2.9.

during the 1st week of illness showed typhoid bacilli, 69 per cent during the 2nd week, and 65 per cent during the

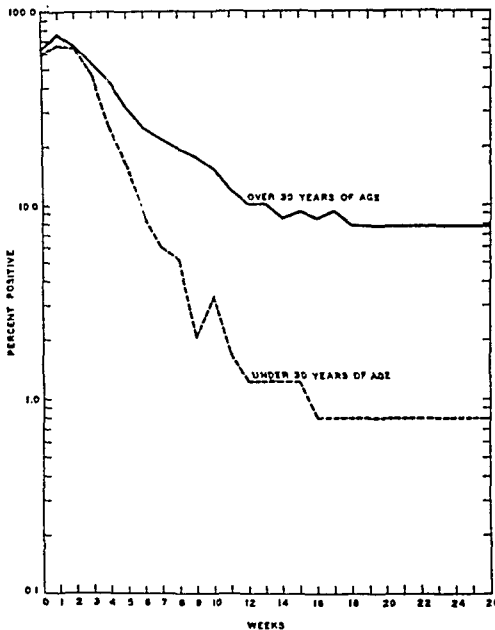


FIGURE 1—Per cent positive fecal specimens by age and week after onset of typhoid fever in New York State exclusive of New York City—374 cases 1938-1939

3rd week. From the 3rd week on there was a rapid decline until an almost constant level was reached at the 20th week.

When the data were analyzed according to sex, differences were observed but they were not statistically significant. The importance of the age factor, however, is striking (Table 3 and Figure 1). At ages 30 and over, 76 per cent of the stools were positive in the 2nd week of the disease, with a decline to 7.7 per cent in the 19th week. At ages under 30 the peak is approximately 66 per cent, also in the 2nd week, followed by a more rapid decline to 0.8 per cent in the 16th week of the disease. Fecal specimens from one female, aged 59, were found to be negative beginning in the 42nd week after the onset of illness.

C. CARRIER PREVALENCE

Estimates of carrier prevalence have recently been made in Massachusetts¹³ and Mississippi.¹⁴ In brief, the method employed in Massachusetts was as fol-

lows: The probable number of typhoid cases resulting in recovery was estimated to be equal to nine times the number of reported deaths, and 2 per cent of these survivors were assumed to be chronic carriers; the carrier prevalence in any particular year was represented by those who had become carriers during the preceding 40 years. In Mississippi, the number of persons with a history of having had typhoid fever was determined by means of a field survey of approximately 1 per cent of the population; 3.27 per cent of the persons with a history of typhoid were considered to be chronic carriers. Both methods of estimation admittedly resulted in only rough approximations. The principal deficiency in these methods is that they fail to consider the marked variations in the rates of carrier production among typhoid cases in the several age groups as shown in Table 1. A statistical technic based upon a modified life table procedure is proposed which takes into account the age distribution of carriers resulting from cases, and it may possibly give a more accurate estimate of carrier prevalence than can be ob-

tained with either of the two previously mentioned methods.

In order to apply this method, the following assumptions were made:

1. That a constant relationship has existed during the study period between the number of cases of typhoid fever and the number of deaths from the disease; a case fatality rate of 10 per cent is considered to have been maintained.

2. That the age distribution of recovered typhoid fever cases was the same during past decades as that observed during 1930-1939 (Table 1).

3. That 2.9 per cent of those patients who recover from typhoid fever remain chronic carriers; and that the rate of carrier genesis for each age group was the same in past decades as that observed during 1930-1939. As a corollary of this and the previous assumption; the age distribution of carriers produced in past decades is assumed to be the same as that observed during 1930-1939 (Table 1).

4. That carriers produced during a given decade survive to the beginning of the next decade; and that subsequent to that time they suffer the same age specific mortality risks as the general population.

5. That no carriers have been cured of their carrier condition.

It is believed that errors introduced through these assumptions do not seriously affect the final estimate of carrier

TABLE 4

Number of Typhoid Fever Deaths, Estimated Persons Surviving an Attack of Typhoid Fever and Typhoid Carriers Produced During Each Decade 1860-1939

New York State, Exclusive of New York City

| <i>Decade</i> | <i>Typhoid Deaths</i> | <i>Estimated Survivors</i> | <i>Estimated Carriers Produced</i> |
|---------------|-----------------------|----------------------------|------------------------------------|
| (1) | (2) | (col. 2 x 4) | (col. 3 x 2.9%) |
| | (3) | | (4) |
| 1860-69 | 15,378 * | 138,402 | 4,014 |
| 1870-79 | 13,626 * | 122,634 | 3,556 |
| 1880-89 | 12,288 * | 110,592 | 3,207 |
| 1890-99 | 10,953 * | 98,577 | 2,859 |
| 1900-09 | 9,593 | 86,337 | 2,504 |
| 1910-19 | 5,236 | 47,124 | 1,367 |
| 1920-29 | 1,713 | 15,417 | 447 |
| 1930-39 | 444 | 3,996 | 116 |

* Typhoid deaths for each decade from 1860 to 1899 were estimated on the basis of the following mean annual typhoid death rates:

| | |
|-----------|-----------------------------|
| 1860-1869 | — 55 per 100,000 population |
| 1870-1879 | — 45 per 100,000 population |
| 1880-1889 | — 37 per 100,000 population |
| 1890-1899 | — 30 per 100,000 population |

prevalence in New York State. On the basis of assumptions (2) and (3), the final estimate is believed to be somewhat lowered, whereas assumptions (4) and (5) increase the final estimate.

The number of typhoid fever deaths, the estimate persons recovering from an attack of typhoid fever, and the expected number of carriers produced are shown in Table 4 for each decade since 1860. The first step in the life table procedure was to distribute the carriers according to age group at the time of their attack of typhoid (Table 5). These groups are designated as l_x cohorts.

formly distributed within the age group and assume that all 88 carriers comprising this sub-cohort survived to January 1, 1870, half of them, or 44 carriers, would still have been under 10 years of age on that date, and 44 carriers would have become 10-19 years of age (Table 6, column L_x for 1870). The latter group of 44 carriers would be over 80 years of age on January 1, 1940, and need not be considered in our further calculations. To determine how many of the 44 carriers under 10 years of age would live to enter the 10-19 age group on January 1, 1880, this number.

TABLE 5

Distribution by Age Group of the Estimated Number of Typhoid Carriers Produced During Each Decade (l_x Cohorts)

1860-1939

New York State, Exclusive of New York City

| Age Group at Onset of Typhoid Fever | Per cent Total Carriers | Estimated Number Carriers Produced | | | | | | | |
|--|-------------------------------|------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| | | 1860- 1869 | 1870- 1879 | 1880- 1889 | 1890- 1899 | 1900- 1909 | 1910- 1919 | 1920- 1929 | 1930- 1939 |
| Under 10 | 2.2 | 88 | 78 | 71 | 63 | 56 | 30 | 10 | 3 |
| 10-19 | 3.3 | 134 | 118 | 107 | 95 | 83 | 46 | 15 | 4 |
| 20-29 | 13.3 | 535 | 474 | 427 | 381 | 234 | 182 | 60 | 15 |
| 30-39 | 20.0 | 803 | 711 | 641 | 572 | 501 | 273 | 89 | 23 |
| 40-49 | 28.9 | 1,160 | 1,028 | 927 | 826 | 723 | 395 | 129 | 34 |
| 50-59 | 21.1 | 847 | 751 | 677 | 604 | 529 | 289 | 94 | 24 |
| 60-69 | 10.0 | 402 | 356 | 321 | 286 | 250 | 137 | 45 | 12 |
| 70-79 | 1.1 | 45 | 40 | 36 | 32 | 28 | 15 | 5 | 1 |
| All ages | 100.0 | 4,014 | 3,556 | 3,207 | 2,859 | 2,504 | 1,367 | 447 | 116 |

If we arbitrarily limit our problem to the determination of the prevalence of carriers under 80 years of age as of January 1, 1940, it becomes unnecessary to follow the life table survivorship of every carrier produced in the past. Hence, of the 4,014 carriers comprising the l_x cohort of 1860-1869, only those carriers who were under 10 years of age on January 1, 1870, are pertinent to our problem since the other carriers from this cohort would necessarily be over 80 years of age on January 1, 1940. If we assume that the carriers in this cohort under 10 years of age were uni-

multiplied by the estimated life table survivorship rate of 0.963.* Thus, it was calculated that 42 of the 44 carriers would have survived (Table 6, column C_x for 1880). The next step was to obtain the L_x cohort as of January 1, 1880. Inasmuch as carriers in this cohort who were over 20 years of age would be over 80 years of age on Janu-

* Life table survivorship rates by age group for 1910-1919, 1920-1929, and 1930-1939 were calculated from abridged life tables for New York State, exclusive of New York City. The life tables were constructed in accordance with the procedure proposed by Reed and Merrill.¹⁵ The survivorship rates obtained for 1910-1919 were used for the decades prior to 1910.

TABLE 6

Computation by a Modified Life Table Procedure of the Probable Number of Typhoid Carriers by Age Group (L_x Cohorts) as of January 1 of Each Decade, 1870-1900

New York State, Exclusive of New York City

| Age Group (x) | $l_{\bar{x}}$ (1860-1869) | L_x (1870) | $10p_x$ † (1870-1879) | C_x (1880) | $l_{\bar{x}}$ (1870-1879) | L_x (1880) | $10p_x$ † (1880-1889) |
|---------------|------------------------------|-----------------|--------------------------|-----------------|------------------------------|-----------------|--------------------------|
| Under 10 | 88 | 44 | 0.963 | .. | 78 | 39 | 0.963 |
| 10-19 | * | (44)* | | 42 | 118 | 140 | 0.957 |
| 20-29 | * | * | | * | * | (59)* | |
| 30-39 | * | * | | * | * | * | |
| 40-49 | * | * | | * | * | * | |
| 50-59 | * | * | | * | * | * | |
| 60-69 | * | * | | * | * | * | |
| 70-79 | * | * | | * | * | * | |
| Total | 88 | 88 | | 42 | 196 | 238 | |
| All ages | 4,014 | | | | 3,556 | | |

| Age Group (x) | C_x (1890) | $l_{\bar{x}}$ (1880-1889) | L_x (1890) | $10p_x$ † (1890-1899) | C_x (1900) | $l_{\bar{x}}$ (1890-1899) | L_x (1900) |
|---------------|-----------------|------------------------------|-----------------|--------------------------|-----------------|------------------------------|-----------------|
| Under 10 | .. | 71 | 35 | 0.963 | .. | 63 | 31 |
| 10-19 | 38 | 107 | 127 | 0.957 | 34 | 95 | 113 |
| 20-29 | 134 | 427 | 401 | 0.937 | 122 | 381 | 360 |
| 30-39 | * | * | (214)* | | 376 | 572 | 853 |
| 40-49 | * | * | * | | * | * | (286)* |
| 50-59 | * | * | * | | * | * | * |
| 60-69 | * | * | * | | * | * | * |
| 70-79 | * | * | * | | * | * | * |
| Total | 172 | 605 | 777 | | 532 | 1,111 | 1,643 |
| All ages | | 3,207 | | | | 2,859 | |

* Carriers are not included who would be over 80 years of age as of January 1, 1940.

† Values of $10p_x$ are assumed to be the same as those calculated for the decade 1910-1919.

$l_{\bar{x}}$ represents a cohort of typhoid carriers produced during a decade according to age groups x at the time of their attack of typhoid.

L_x represents a cohort of typhoid carriers according to age groups x as of January 1 of a given year.

$10p_x$ designates the probability of persons in the general population at age group x surviving to age group x + 10.

C_x represents a cohort of typhoid carriers, according to age groups x as of January 1 of a given year, who are the survivors from a preceding L_x cohort.

ary 1, 1940, only the carriers in the two sub-groups under 20 years of age are of interest. These groups were constituted as follows: the 39 carriers comprising the L_x sub-cohort under 10 years of age were derived from half the 78 carriers under 10 years of age produced between 1870 and 1879; the 140 carriers comprising the L_x sub-cohort 10-19 years of age were obtained by the addition of three groups of carriers: 39 were the other half of the 78 carriers under 10 years of age produced between 1870 and 1879; 59 were half of the 118 carriers 10-19 years of age produced between 1870-1879; and 42 were the

mentioned survivors 10-19 years of age.

The procedure described above was continued for successive decades until the L_x cohort for January 1, 1940, was obtained; the detailed computations are shown in Tables 6 and 6-A. Thus, it was estimated that 2,490 typhoid carriers under 80 years of age were living in New York State, exclusive of New York City, on January 1, 1940. The carrier prevalence rate is calculated to be 42 carriers for each 100,000 persons under 80 years of age. While no strict comparisons are justified, it is interesting to note that the carrier prevalence

TABLE 6-A

Computation by a Modified Life Table Procedure of the Probable Number of Typhoid Carriers by Age Group (L_x Cohorts) as of January 1 of Each Decade, 1900-1940

New York State, Exclusive of New York City

| Age Group (x) | L_x (1900) | $_{10}p_x$ † (1900-1909) | C_x (1910) | $l_{\overline{x}}$ (1900-1909) | L_x (1910) | $_{10}p_x$ † (1910-1919) | C_x (1920) | $l_{\overline{x}}$ (1910-1919) |
|---------------|-----------------|-----------------------------|-----------------|-----------------------------------|-----------------|-----------------------------|-----------------|-----------------------------------|
| Under 10 | 31 | 0.963 | .. | 56 | 28 | 0.963 | .. | 30 |
| 10-19 | 113 | 0.957 | 30 | 83 | 99 | 0.957 | 27 | 46 |
| 20-29 | 360 | 0.937 | 108 | 234 | 267 | 0.933 | 95 | 182 |
| 30-39 | 853 | 0.920 | 337 | 501 | 704 | 0.920 | 249 | 273 |
| 40-49 | (286)* | | 785 | 723 | 1,397 | 0.877 | 648 | 395 |
| 50-59 | * | | * | * | (362)* | | 1,225 | 289 |
| 60-69 | * | | * | * | * | | * | * |
| 70-79 | * | | * | * | * | | * | * |
| 80 and over | * | | * | * | * | | * | * |
| Total | 1,643 | | 1,260 | 1,597 | 2,857 | | 2,244 | 1,215 |
| All ages | | | | 2,504 | | | | 1,367 |

| Age Group (x) | L_x (1920) | $_{10}p_x$ † (1920-1929) | C_x (1930) | $l_{\overline{x}}$ (1920-1929) | L_x (1930) | $_{10}p_x$ † (1930-1939) | C_x (1940) | $l_{\overline{x}}$ (1930-1939) | L_x (1940) |
|---------------|-----------------|-----------------------------|-----------------|-----------------------------------|-----------------|-----------------------------|-----------------|-----------------------------------|-----------------|
| Under 10 | 15 | 0.973 | .. | 10 | 5 | 0.984 | .. | 3 | 1 |
| 10-19 | 65 | 0.964 | 15 | 15 | 27 | 0.979 | 5 | 4 | 9 |
| 20-29 | 209 | 0.947 | 63 | 60 | 101 | 0.969 | 26 | 15 | 35 |
| 30-39 | 476 | 0.930 | 198 | 89 | 272 | 0.948 | 98 | 23 | 117 |
| 40-49 | 982 | 0.883 | 443 | 129 | 552 | 0.893 | 258 | 34 | 287 |
| 50-59 | 1,567 | 0.774 | 867 | 94 | 979 | 0.780 | 493 | 24 | 522 |
| 60-69 | (145)* | | 1,213 | 45 | 1,282 | 0.570 | 764 | 12 | 782 |
| 70-79 | * | | * | * | (23)* | | 731 | 1 | 737 |
| 80 and over | * | | * | * | * | | * | * | (1)* |
| Total | 3,459 | | 2,799 | 442 | 3,241 | | 2,375 | 116 | 2,491 |
| All ages | | | | 447 | | | | 116 | |

* Carriers are not included who would be over 80 years of age as of January 1, 1940.

† Values of $_{10}p_x$ for the decade, 1900-1909, are assumed to be the same as those calculated for 1910-1919. For explanation of symbols, see footnote of Table 6.

rates for Massachusetts and Mississippi in 1935 were estimated to be 48 and 288 per 100,000 population, respectively.

At this point, it should be recalled that one of the basic assumptions made in calculating the New York State carrier prevalence was that 2.9 per cent of patients who recover from typhoid fever remain chronic carriers. It is realized that the true rate of carrier genesis may be higher than 2.9 per cent. The estimate may therefore be considered to be a minimum.

In Table 7 the estimated carriers are shown distributed according to age group and are related to the estimated population and to the number of carriers under supervision as of January 1,

1940. The age-specific carrier prevalence rates are observed to increase with advancing age group. The rate among children under 10 years of age was less than 1 per 100,000, whereas the rate among persons 70-79 years of age was 340 per 100,000. Of the 2,490 estimated carriers 419,* or 17 per cent, were under supervision. This percentage is shown to vary considerably with age. While only 14 per cent of the carriers over 50 years of age were known to the health authorities, the proportion of carriers under 50 years of age who were under supervision averaged 28 per cent.

Further examination of the age dis-

* Nineteen carriers under supervision are excluded who were over 80 years of age on January 1, 1940.

TABLE 7

Estimated Prevalence of Typhoid Carriers and Known Typhoid Carriers Under Supervision According to Certain Age Groups as of January 1, 1940

New York State, Exclusive of New York City

| Age Group | Census Population as of April 1, 1940 | Estimated Number of Carriers | Carrier Prevalence Rate per 100,000 | Number of Carriers under Supervision | Per cent of Estimated Carriers under Supervision |
|-----------|--|------------------------------------|--|---|---|
| Under 10 | 826,514 | 1 | 0.1 | 1 | 100.0 |
| 10-19 | 1,002,712 | 9 | 0.9 | 4 | 44.4 |
| 20-29 | 992,718 | 35 | 3.5 | 8 | 22.9 |
| 30-39 | 918,260 | 117 | 12.7 | 28 | 23.9 |
| 40-49 | 861,065 | 287 | 33.3 | 84 | 29.3 |
| 50-59 | 678,305 | 522 | 77.0 | 95 | 18.2 |
| 60-69 | 455,795 | 782 | 171.6 | 119 | 15.2 |
| 70-79 | 216,584 | 737 | 340.3 | 80 | 10.9 |
| Total | 5,951,953 | 2,490 | 41.8 | 419 | 16.8 |

TABLE 8

Computation by a Modified Life Table Procedure of the Probable Number of Typhoid Carriers by Age Group (L_x Cohorts) as of January 1 of Each Decade, 1900-1980

New York State, Exclusive of New York City

| Age Group (x) | L_x (1940) | $10p_x$ † (1940- 1949) | C_x (1950) | l_x (1940- 1949) | L_x (1950) | $10p_x$ † (1950- 1959) | C_x (1960) | l_x (1950- 1959) |
|---------------------|-----------------|------------------------------|-----------------|--------------------------|-----------------|------------------------------|-----------------|--------------------------|
| Under 10 | 1 | 0.989 | .. | 2 | 1 | 0.989 | .. | 1 |
| 10-19 | 9 | 0.986 | 1 | 3 | 3 | 0.986 | 1 | 2 |
| 20-29 | 35 | 0.979 | 9 | 11 | 16 | 0.979 | 3 | 8 |
| 30-39 | 117 | 0.958 | 34 | 16 | 48 | 0.958 | 16 | 11 |
| 40-49 | 287 | 0.903 | 112 | 23 | 131 | 0.903 | 46 | 16 |
| 50-59 | 522 | 0.789 | 259 | 17 | 279 | 0.789 | 118 | 12 |
| 60-69 | 782 | 0.575 | 412 | 8 | 425 | 0.575 | 220 | 6 |
| 70-79 | 737 | .. | 450 | 1 | 454 | .. | 244 | 1 |
| 80 and over | * | .. | * | .. | (1)* | .. | * | .. |
| Total | 2,490 | .. | 1,277 | 81 | 1,358 | .. | 648 | 57 |

| Age Group (x) | L_x (1960) | $10p_x$ † (1960- 1969) | C_x (1970) | l_x (1960- 1969) | L_x (1970) | $10p_x$ † (1970- 1979) | C_x (1980) | l_x (1970- 1979) | L_x (1980) |
|---------------------|-----------------|------------------------------|-----------------|--------------------------|-----------------|------------------------------|-----------------|--------------------------|-----------------|
| Under 10 | .. | 0.989 | .. | 1 | .. | 0.989 | .. | 1 | .. |
| 10-19 | 3 | 0.986 | .. | 1 | 1 | 0.986 | .. | 1 | 1 |
| 20-29 | 8 | 0.979 | 3 | 5 | 6 | 0.979 | 1 | 4 | 4 |
| 30-39 | 25 | 0.958 | 8 | 8 | 15 | 0.958 | 6 | 5 | 10 |
| 40-49 | 60 | 0.903 | 24 | 12 | 34 | 0.903 | 14 | 8 | 21 |
| 50-59 | 132 | 0.789 | 54 | 8 | 64 | 0.789 | 31 | 6 | 38 |
| 60-69 | 229 | 0.575 | 104 | 4 | 110 | 0.575 | 50 | 3 | 54 |
| 70-79 | 247 | .. | 132 | 1 | 134 | .. | 63 | .. | 65 |
| 80 and over | (1)* | .. | * | .. | (1)* | .. | * | .. | .. |
| Total | 705 | .. | 325 | 40 | 365 | .. | 165 | 28 | 193 |

* Carriers are not included who would be over 80 years of age.

† Values of $10p_x$ are assumed to be the same as those calculated for 1940.

For explanation of symbols, see footnote of Table 6.

tribution of the estimated carriers shows that 61 per cent were between 60 and 80 years of age. In view of their advanced age, a large number of these

carriers may be expected to die annually. Using the proposed life table procedure, the future prevalence of carriers was calculated to January 1, 1980

(Table 8).^{*} Thus, it is estimated that in that year the number of carriers under 80 years of age will have decreased from 2,490 to 193.

CONCLUSIONS

1. The data presented indicate that age and sex are of importance in the development of the typhoid carrier state.

2. Typhoid patients over 30 years of age became chronic carriers nine times as frequently as did younger patients.

3. The rate of development of the carrier state at all ages was 2.1 per cent among male cases, as compared with 3.8 per cent among female cases.

4. Approximately 16 per cent of the females who developed typhoid between ages 40 and 49 became chronic carriers.

5. The rate of bacteriological cure varied inversely with age.

6. A modified life table method was applied to the typhoid experience of New York State, exclusive of New York City, and resulted in an estimated carrier prevalence on January 1, 1940, of approximately 2,500 carriers under 80 years of age, or 42 carriers per 100,000 population.

^{*} The number of carriers produced annually between 1940 and 1949 was estimated as equal to the mean number produced between 1935 and 1939. The estimated number of carriers produced in each subsequent decade was obtained by assuming that the rate of decrease between 1930-1939 and 1940-1949 continued.

7. It is highly probable that there will be a rapid decline in carrier prevalence. In 40 years it is estimated that the carrier prevalence will decrease to about 200.

8. Four hundred and nineteen, or 17 per cent, of the estimated carriers in the state were under supervision on January 1, 1940.

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The Use of Vital Records in Military Service—The Navy*

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ANY discussion of the registering of deaths, illnesses, and injuries in the Navy must be prefaced by some little discussion of the principles behind the registration process. The Medical Department of the Navy is charged with the responsibility of seeing that men recruited are physically fit. The physical standards have been long established and all recruits must meet them. After the men have entered the Navy, the Medical Department must care for them. It must see to it that they are ill as little as possible and that injuries are kept to a minimum. In other words, the Navy man must be kept fit to fight at all times. The third responsibility is that of discharging from the naval service those men who are no longer able to perform their duties.

A good system of registration of vital records must have these three responsibilities among its most important considerations. It must measure the worth of the recruiting examinations and quickly pick up those few unfit men who get by medical examiners. It must at all times show a current picture of health conditions throughout the Navy, and it must contain a mechanism which can aid most efficiently in discharging those men who are incapacitated for further duty either because of service

conditions or conditions which existed prior to their enlistment.

The vital statistics system must be simple enough to run efficiently in the midst of excitement and upset conditions incident to great naval expansion in time of war. The Navy now has men in such distant places as the Solomon Islands, the Aleutians, the South Atlantic, Iceland, and the cold waters of the North Atlantic on the route to Murmansk. Obviously a top-heavy reporting mechanism could not take care of the recording of morbidity and mortality in such out-of-the-way places of the world within any reasonable period of time. The Navy has expanded from the 150,000 men of 1939 to something over 1,300,000 today, which means that many new doctors and hospital corpsmen are responsible for the efficient basic handling of our morbidity and mortality records, and no long instruction in the handling of these records is possible.

Another fundamental requirement of the Navy's vital statistics system is that it be speedy, for nowadays an epidemic which breaks out in one ship can quickly be passed to another ship and in a short space of time to another port and even to another continent. An epidemic which breaks out in Iceland is a threat to the men of New York just as it is to men in Florida. Finally, of course, our statistics must not sacrifice all detail in order to obtain currency and simplicity.

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To summarize briefly, our statistics must afford some measure of the effectiveness of our recruiting examinations, must give the current picture of health conditions, must indicate the need for medical discharge from the service, and must be as current and simple to administer as possible.

I shall now turn to a description of our reporting system and you may judge for yourself how well it lives up to the requirements which have been outlined. A card, called an "F" card, is made out every time a man is discharged from the sick list of any ship or station in the Navy. Because of the confining nature of naval life and the possibility of whirlwind spread of infectious diseases, admissions to the sick list and consequent isolation are rather frequent. A card is required for every discharge because a card for every admission would leave incomplete information on most cases. The time between admission and discharge from the sick list is usually so short that no great lag is created by counting all discharges rather than all admissions. If a man is admitted to the sick list aboard a destroyer because of a broken leg and then transferred to a hospital ship and finally to a hospital ashore, we will receive three cards—one for his discharge from the destroyer to the hospital ship, one from the hospital ship to the hospital ashore, and finally one from the hospital to duty when he has recovered. This example will boil down to one broken leg in our records but three "F" cards would have been received on the case.

The "F" card is a very simple form and causes comparatively little work aboard ship. It contains such fundamental data as name, race, date and place of birth, length of service, rank or rate, diagnosis, manner of admission and discharge, and the place of admission. Such items as race, date and place of birth aid us in identifying the man (or the woman, now, in the case of the

WAVES), while other items such as rank and length of service are of considerable epidemiological importance. The causative agent is an important injury item which is entered on the card.

There are four manners of admission to the sick list, and five manners of disposition. The four manners of admission are first, "new admission"; second, "readmission," for a disease or injury for which the man has already been on the sick list; third, the "EPTE," or an admission for conditions which are considered to have existed prior to entry into the Naval service; and the fourth is an "ACD," or an admission for contributory disability. An example of an "ACD" would be therapeutic poisoning as a complication of the treatment of syphilis. The five manners of disposition or discharge from the sick list are first, the disposition to "Duty"; second, "Change of Diagnosis"; third, "Death"; fourth, "Invaliding from the Service"; and the fifth is "Desertion."

You will have noticed that one of the manners of admission is an "EPTE" or admission with condition existing prior to enlistment. Such admissions measure the effectiveness of the recruiting examination, but it should be remembered that many conditions cannot be detected in a routine examination, and must await observation under service conditions before they can be discovered. Also, one of the manners of disposition is the "Invaliding from the Service," which is applied to those men who have been found to be unfit for naval service either because they were not fit to enter it or contracted some disease or injury during their service. So much for the reporting system and the "F" card.

Now let us see what uses may be made of the card after it has been received, edited, coded, and punched in the Bureau of Medicine and Surgery in Washington. In addition to the items which I have already listed, every re-

port of new admission for a venereal disease has the "probable place of exposure" noted on it. This has proved of inestimable value to venereal disease control officers, for no longer can a city claim that infected men aboard a ship based there acquired the disease elsewhere. A weekly report is now made of all venereal disease records, tabulating the probable place of exposure, and our venereal disease authorities are afforded valuable data on which to base their efforts.

As the cards are received, and even before they pass the mail desk, they can be scrutinized to see if any unusual occurrence has been reported. Daily reports can be made if necessary from cards received in the mail. This was recently found advisable in the case of jaundice which, as you all know, attracted considerable attention of late. (It was found, incidentally, that the naval service suffered little from jaundice in the past year and a half.) After the cards have been edited, coded, and given a preliminary punching for ease of filing, they are punched on another card for filing by diagnosis while the "F" cards are filed by name.

The diagnosis file becomes a fertile source of data for special studies of all sorts. Comprehensive studies have recently been made of gonorrhea, syphilis, and the more common communicable diseases such as measles, mumps, and chicken pox. The occurrence of these diseases has been investigated in connection with length of service, ship, station, occupation, age, and race. Much light has thus been shed on the problems of prevention of these diseases. For instance, it has been found that mumps, measles, chicken pox, and other diseases of this sort are more frequent in the very first weeks and months of enlistment while venereal diseases are most frequent among men in their third and fourth years of enlistment. Control measures can now be specifically aimed

at those groups where the incidence of disease is most severe.

Not long ago while the program for naval expansion was in its infancy the question arose as to whether the policy of earlier years in regard to the temporary quarantine of new recruits should be continued. In the past, recruits have been quarantined for six or eight weeks immediately after their enlistment. One of the officers of the Division of Preventive Medicine had made an excellent study of common communicable diseases and data were at hand from which to form a good judgment as to the course to follow. The data which had been prepared for previous years were quickly brought up to date and presented to the members of a conference called to consider the matter of the planning of training stations. Without the "F" cards or some very close approximations of them, it would have been necessary to have answered on the basis of "hunch" and conviction rather than facts and figures.

The present war has caused attention to be focused on the prevalence of mental diseases. One of the classes of the Diagnostic Nomenclature of the Medical Department of the Navy is called Diseases of the Mind. We have been able to bring together data for the last twenty or more years, and right up to date in this year regarding these conditions. Other studies are now under way on other conditions which I could mention at this time and they are all possible because of the ease and simplicity of the "F" card which has been in use since 1912. Many improvements have been made but the basic theories behind it have not been altered.

Though the "F" card has as one of its manners of disposition "Death," there is an additional form for deaths. It is called "Form N" and it corresponds very closely with the usual death certificates of health departments. In the past, a copy of this death certificate

has been furnished to the Bureau of the Census, insurance companies, next of kin, and other legitimately interested parties. It has been found, however, that the certificate has occasionally contained data which should not be circulated outside the naval service and a substitute form has been devised which is prepared from the death certificate in the Bureau of Medicine and Surgery and sent to the Bureau of the Census and other responsible parties. All information of a secret or confidential nature is deleted from this form.

In addition to the care of naval personnel, the Medical Department is also responsible for the industrial health of the naval establishments where many thousands of civilian employees are working in Navy Yards, Naval Air Stations, and Naval Ammunition Depots.

Every accident which occurs among these civilian employees from Panama to Alaska and Maine to California is made a matter of record. Even the minor accidents are recorded because it is felt that minor accidents are indicative of the need of preventive measures. A report is made out on every accident by the dispensary where the injured person is treated, and is sent to the Navy Department where a punch card is prepared.

Periodic studies are made of these accidents: those which are common to certain occupations, the kind of tool which is most dangerous, the previous accident record of the individual, and of the safety devices used or needed. All of this is of the utmost concern—for a day lost making a gun is as important as a day lost firing it.

The Use of Vital Records in Military Service—The Army*

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AS a basis for discussion, it is fitting that you first be informed concerning the kind of vital records used in the Army.

The Army keeps complete records of morbidity and mortality of its soldiers (and less complete records of other personnel), both in peace and in wartime. These records are prepared by the Army medical officers and contract surgeons of each post, camp or station. The reasons for the necessity of keeping complete records of all soldier patients were summarized by Lang¹ and Love² as follows:

1. Data are available for the conduct of the business of the War Department and other governmental agencies, with particular reference to the retention of the physically fit in the service, assignments to duty, adjustments to pay accounts and the adjudication of claims for compensation.

2. Diagnostic and therapeutic measures may be evaluated as to their effectiveness.

3. Studies of the nature of diseases may be made.

4. Data may be obtained upon which to base plans for the medical service of the Army in peace and in war. The Army's medical records constitute the most reliable and important source of its military medical experience. These records, says Love, tell the story of the early losses from diseases and non-battle injuries that occur in peace or war and the frequency and fatality of each group. They give in war a detailed account of battle casualties, tell how many occurred on each day, in what units, in what arm or

service, the anatomical location and cause of each one, the rapidity of collection and evacuation of the casualties, and the efficiency of treatment as measured by loss of time, resulting disabilities, and deaths.

5. Finally, the records are used to inform members of families concerning their soldier relative's welfare.

What personnel form the basis of the Army's medical reports?

1. Every person admitted to the station hospital, including infants born in the hospital. (Infants born on or near a military station, but not in the hospital of the station, will be reported only when the birth has been attended by a surgeon of the station.)

2. Every person, who, though not admitted to the hospital, is excused from performance of duty because of sickness or injury.

3. Every person on active duty, who, though not excused from duty, is prescribed for or treated or placed under observation with a view of treatment or with a view to discharge on account of disability.

4. Every person on active duty who is retired for disability, discharged for disability or inaptness, or dies.

5. Every person on active duty transferred to another command (i.e., sent to a general hospital from a station hospital) for observation or treatment, and every person whose case is received by transfer or evacuation from a field medical unit.

6. Every person on active duty who departs from the command on sick leave.

7. Every person in active service who is attended by a medical officer or contract surgeon in a civilian hospital.

8. Every person residing at the station or with the command, but not in the hospital, who dies.

What information is recorded for each person for whom a report is made? In peacetime and in the zone of the

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interior (away from the battle zone) in wartime, the information obtained is: name, register number, Army serial number, grade, company, regiment or arm of service, age, race, nativity, years of service, date, source and cause of admission to report, whether or not the admission was in line of duty, change of diagnosis (if any), complications, intercurrent diseases, surgical operations, final disposition of the case with date, name of hospital, and days of treatment.

A report of sick, wounded or injured, and dead is rendered monthly to The Surgeon General from every military station and separate command which is attended by a medical officer. In time of peace and in the zone of the interior (outside the battle area) in time of war, a standard Report Card (Form 52) gives the pertinent information. This card is an exact copy of the Register Card kept by all stationary commands (including hospitals) in peacetime and by stations, general dispensaries, and fixed hospitals in the zone of the interior in wartime.

The Field Medical Record (52 c and d) and the Emergency Medical Tag (52 b) are the forms of reports used in peacetime by moving commands and by troops training in field service. In wartime in the theater of operations, the Emergency Medical Tag is the form of report used by Medical Department organizations (such as medical regiments, battalions, and squadrons) other than hospitals, where the Field Medical Record is employed. These records are attached to the clothing of the patient and travel with him until more definite disposition is made; i.e., return to duty, arrival in the zone of the interior from the theater of operations, or death.

One way in which all three of these records could be used in the case of one casualty is: a man wounded on the battlefield, when found, has attached to his clothing an Emergency Medical Tag. On arrival at an evacuation hospital,

the Emergency Medical Tag is removed and made a part of the Field Medical Record which is now created. The patient is then transferred from the evacuation hospital in the theater of operations to a general hospital in the zone of the interior. His Field Medical Record travels with him and forms the basis for making (for the first time in this case) the hospital Register Card, which is the ordinary form of report in peacetime. The Field Medical Record is now closed and forwarded directly to The Surgeon General, as is, in time, the copy of the hospital Register Card called the Report Card.

Thus the Report Card, the Field Medical Record, and the Emergency Medical Tag find their way to the Office of The Surgeon General where they form the basis of The Surgeon General's various reports, but particularly of his Annual Report. After processing (including the making of a punch card for statistical use) by the Office of The Surgeon General, the records are sent to the Office of The Adjutant General and find use as the basis of adjustment of compensation claims.

Each hospital keeps Register Cards and, in addition, the clinical record of each patient, as well as a complete outpatient record. These additional records are available to The Surgeon General for more detailed knowledge of any particular case and are of great use in cases of claims for compensation.

In addition to case reports such as those just described, current statistical reports are rendered by the surgeon of every post, camp, station, or separate command as follows:

1. A weekly statistical report relative to the number of sick, injured, and battle casualties; bed status in hospitals; first occurrence, increase, and flow of the more important communicable diseases; and the status and movement of the various stations and commands in the Army.

2. Special telegraphic reports of epidemic diseases.

3. Special reports of acute communicable diseases prevailing at stations when troops are transferred from them.

4. Reports of acute communicable diseases occurring among troops en route.

5. Reports of acute communicable diseases, births and deaths to civil health authorities.

6. Reports of births and deaths to the United States Bureau of the Census.

7. Monthly sanitary report.

8. Monthly venereal report.

It has already been stated that reports must be rendered on births in hospitals, as well as births on or near a military post if the birth is attended by a medical officer or contract surgeon. Attention also was called to the necessity of reporting on cases of communicable disease and deaths of persons in the command or of persons residing at the military station. These reports are required by the military authorities. In addition to the satisfaction of this military duty, Army regulations require that the senior Medical Officer of each station or command acquaint himself with the civil laws and regulations which govern the reporting of communicable diseases, births and deaths in the community in which the station or command is located. It is further stipulated that the original copy of such report bearing the signature of the reporting officer be forwarded to the civil office in question.

Furthermore, Army regulations require that all births and deaths occurring at military stations or in military commands in any state, territory or insular possession of the United States be reported to the Bureau of the Census. Regulations require that in submitting such reports to civil health authorities, a notation be made on the form that the case was reported to the Bureau of the Census, and vice versa.

It may happen, and does happen, that deaths in moving commands and particularly in airplane accidents may be reported to a civil authority but not in the same county or state where death

occurred. The moving of the victim of an accident to the nearest or most adequate hospital facilities may take place across an intercounty or even an interstate line. In the first instance, the coroner of the wrong county may be notified, and in the second, the report may be made to civil authorities of the wrong state. In justification, in certain instances, it may be pointed out that there exist no Chinese Great Walls between counties or states, and it is difficult at times to discover in what county or state an accidental death occurs. Aside from such peculiar and infrequent cases, there is no reason why reports of vital records referring to Army personnel should not be rendered to the proper civil authorities. The Army realizes that the report of births and deaths should form permanent records in the offices to which they are sent and that these records are often of great legal importance. This is the reason that the original copy bearing the signature of the reporting officer is the form sent to the civilian authority.

During the last war, statistics of mortality of military personnel were noted by the Bureau of the Census in tables separate from those representing the civilian population. There are advantages in this system, especially that of keeping separate tab on the armed forces and civilians. I have been informed by Dr. Dunn and Dr. Linder of the Bureau of the Census that the Army and civilians will probably be consolidated in mortality reports of this war. In any case, accurate reports on mortality will now be difficult to obtain, not so much because of incomplete reporting of deaths as because of uncertainty in estimating population bases or strengths in particular states or places. It is certain that the Army has a far more accurate estimate of its strength than the civil authorities have of their population in any place or state. This is because the Army and the armed

forces in general keep a running report of movements of personnel. The various civilian and military authorities interested in food rationing, civilian defense, social security, military security, industrial, agricultural and military manpower, and vital records have no such accurate running check on the shift or migration of population in wartime, or for that matter, at any time. It is important, if not imperative, that a system capable of being so used be devised and put into operation.

I wish to close with the remark that it is my belief and hope that the medical officers of the Army, most of them fresh from civilian life, will coöperate in this time of stress and difficulty with all local and national keepers of vital records to the utmost of their power.

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Community Nursing Service During Wartime*

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THE subject of coördinated community nursing services is an old story which has, during peacetime, long been a preoccupation of progressive public health administrators and workers, and of citizens particularly interested and active in the organization and administration of public health in their communities. Now, during wartime, it takes on a new angle of urgency, if not of immediate necessity. Never has there been a more specific incentive for putting into operation in every community a plan whereby an equitable distribution can be achieved of the total supply of public health nursing that remains for the civilian population after requirements for the military population have been fully met.

The careful, conscientious social planning so important during ordinary times becomes imperative during wartime, if all wastes of man power and facilities are to be eliminated, and if the deficiencies in availability and quality of service so characteristic of a lack of social planning are to be overcome.

We are all familiar with the quantitative and qualitative disparities in public health nursing that existed in ordinary times between geographical regions, between town and country, and between individual communities. Now, in many places, movements of popula-

tion have accentuated these disparities, and in numerous communities sudden growths in population accompanied by shortages in hospital facilities and in medical and nursing personnel have brought into sharp relief the inadequacies in their health services. Health problems have been aggravated or intensified and new ones have arisen, which place greater demands than ever upon the usual public health nursing resources.

We are now faced with the dual problem of transferring public health nurses from communities where the conditions are least acute to under-served communities, and, also, of releasing eligible public health nursing personnel from civilian to military service.

When more babies are being born and fewer women can be delivered in hospitals, or when the women who are delivered in hospitals stay there for a much shorter period, then the needs for maternity nursing in the home are bound to expand. More home deliveries and discharge from hospitals early in the postpartum period mean more public health nursing, if not for direct service only, certainly for a combination of direct service and supervision and teaching of helpers of various kinds.

When there are fewer physicians at the same time that there is particular need for additional vigilance and education in the control of acute communicable disease, tuberculosis, and venereal disease, nurses with training

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and experience in the public health aspects of those conditions are also needed more than ever.

When care of children needs to be rationed because millions of women are needed in the manufacture of war materials, then the fewer real or substitute mothers who remain at home to care for children, besides or instead of their own, must be given all the help and education possible in protecting their health and welfare. Nurses with training and experience in supervising and teaching child care in the home are needed for this purpose.

When more of the chronically ill and acutely ill will be cared for at home instead of in hospitals, then more of the types of care, treatment, and instruction, usually given by physicians, will in their absence devolve upon the public health nurse.

These are but a few examples of change in the usual public health nursing situation for which every community must prepare at a time when there are fewer rather than more qualified workers.

Although most of us have no illusions about the nonproductive organizational and administrative practices that have been indulged in and are still prevalent, we realize that any confusion or disunity which hampers the fullest use of trained personnel, unconscious or unwilful as this may be, now amounts to a form of sabotage.

Some illustrations of community nursing services as organized and administered in the present year, 1942, are furnished through an N.O.P.H.N. study now in progress, of needs and organized resources for nursing care of the sick in their homes. To date 12 communities, representing as many states in the northeast, southeast, north and south central portions of the United States, have been surveyed. (Two communities in the Pacific area are to be included in the study before its com-

pletion.) One county is included in the sampling, and the 11 other areas are towns and cities ranging in size from approximately 14,000 to 120,000. Even though the communities chosen for this study were known not to have organized resources for nursing care of the sick in their homes—thus eliminating the usual public health nursing association or visiting nurse association—in some of them there still appears to be considerable decentralization of public health nursing among numerous agencies.

Only 2 of the 12 communities surveyed to date, having populations of approximately 21,000 to 25,000 respectively, have no more than 2 agencies administering public health nursing. In one of these, the county health department assumes sole responsibility for public health nursing services, and in the other the services of the county health department are supplemented by those of an insurance company. Both of these communities, which happen to be located in the deep South, are characterized by sudden large increases in population—one having doubled its population and the other having grown from approximately 25,000 to 40,000 within the last 2 years. If the ratio of public health nurses to population is any clue to adequacy of service, it is significant to note that the distribution in one of these is 1 public health nurse to 10,000, and in the other, 1 to 13,000.

Because of the proximity of these two towns to military centers, the new population outside the centers is a young one. The needs for maternal care, child health supervision, and communicable disease control and care are particularly great. At present, no home nursing care of those sick with communicable or non-communicable disease, no delivery nursing, and very limited amounts of antepartum and postpartum care are available.

Clearly, in communities such as

these, the answer is not coördination of service or of local redistribution of service, but rather one of national distribution whereby communities not having had such radical changes in population but having adequate or fairly adequate public health nursing resources would release public health nurses for civilian services in these acutely needy communities.

Among the remaining 10 communities of the 12 surveyed to date, the largest number of agencies administering public health nursing in a single community was 11—where 4 official and 7 nonofficial agencies employed 23 public health nurses for a population of about 120,000. This represents the largest city in the sampling. The ratio here is approximately 1 public health nurse to 5,000 people. Included among the 7 nonofficial agencies are 3 industrial plants, employing a total of 6 nurses for services to employees within these plants. The public health nursing services in this community are characterized by a high degree of specialization, both as to administration and types of service. For instance—

By special groups of clients: 5, or a little less than one-fourth of all public health nurses, give service only to industrial workers in the plant; 2 give service to industrial workers and their families; 1 gives service only to recipients of public assistance from the township; 3 give care only to insurance policy holders.

By age groups: 8, or more than one-third, give service only to school children.

By type of disease: 1 gives service to tuberculosis patients only; 2 give to those with venereal disease only; 1 gives to those with acute communicable disease.

This community has also witnessed a rather rapid increase in population because of the particular industries centered there. It would seem to

furnish an example of wasteful use of public health nursing personnel, besides numerical insufficiency. In this particular city, it might well be that pooling of all public health nurses and redistribution of their services on the basis of total community requirements by assigning each field nurse, regardless of administering agency, to a definite district for general service would spread the existing public health nursing personnel in a way to give a much more adequate service. As a matter of fact, although more than one-third of the public health nurses serve only the school population, nursing care of the sick, maternity nursing, and infant and preschool nursing supervision are not available except to holders of policies in insurance companies.

The fact that the shortage in hospital beds and personnel is unusually marked in this community and the ranks of physicians are being depleted rapidly, makes one wonder how this city will manage under the present circumstances.

Among the other 9 communities is one county. Here the population of about 274,000 has its public health nursing services administered by 12 agencies—9 being local boards of education, 1 a county department of health, and 2 insurance companies. The local boards of education employ 13 public health nurses, or approximately 31 per cent of all those working in the county. The health department offers a general service exclusive of care of the sick and delivery nursing, and limits its maternity nursing to patients registered for medical care in its own clinics. Two nurses engaged by an insurance company give the usual service to their policy holders.

The ratio of public health nurses to population in this county is 1 to 8,500, which would indicate that even if the direct services of all the nurses were general instead of having those of ap-

proximately one-half of them specialized either by age or special client group, care of the sick and delivery nursing in the home could not be given to any appreciable extent. Here, again, the problem seems to be more one of numerical inadequacy than one of maldistribution.

The smallest town represented in the sampling—one of slightly more than 14,000 people—has its public health nursing services divided among 7 agencies, 3 official and 4 nonofficial, as follows: a city board of health, a city board of education, one division of the state department of health, one industrial plant, two insurance companies, and one tuberculosis association. Since some of the 7 nurses give only part-time service to this community—for instance, those employed by the tuberculosis association, the state board of health, and the insurance companies—the community actually receives the equivalent of the full time of $4\frac{1}{2}$ nurses.

Here, some nursing care of the sick and maternity nursing exclusive of delivery, is given by the nurse employed by the local board of health. It is the only instance among the communities surveyed where a health department administers nursing care of the sick and also collects fees for this service.

This community would seem to be in a position to pool its varied resources to secure a better coördinated and better distributed service from the same number or a smaller number of workers. Now, when numerous agencies are involved to some extent, no preschool health supervision, no communicable disease nursing, and practically no prenatal care are available, although the ratio of public health nurses to population is 1 to about 3,000.

Of the remaining 7 cities and towns which comprise the present sampling, in 4, 3 agencies employ public health nurses, and in 3, there are 6 such

agencies. The communities in the former group range in size from approximately 98,000 to 15,000 and in the latter group from 62,000 to 10,500. Just one more example from this latter group—a town of about 15,000 population according to a 1942 estimate—where greatly increased industrial activity has resulted in population disturbances, overtaxed housing resources, and also added needs for health services.

Here, 6 separate groups are involved in the administration of public health nursing—3 separate units of the state department of health, each employing nurses separately for 3 special types of services. Two of the 3 public health nurses engaged for maternity and child health service receive some salary from the local boards of health and education. All 3 are, theoretically at least, assigned to the local board of health, whose executive officer is a layman. One state nurse is assigned for venereal disease control, and the other for epidemiological investigations of certain communicable diseases.

The nonofficial agencies employing public health nurses for services to this community are one industrial plant, one combination visiting nurse and tuberculosis association, and one insurance company. Although the actual number of public health nurses giving some service is 8, it is really the equivalent of the time of 6 full-time nurses.

Using the estimated population figure of 15,000, the ratio of nurses to population would be 1 to 2,500. This very favorable ratio would lead one to expect a comprehensive service, but the survey revealed that only policy holders in one insurance company received nursing care of the sick in the home; that there is no home delivery nursing, and no communicable disease nursing besides epidemiological investigations of certain diseases.

This community seems to afford an illustration of uneconomical use of existing resources through over-specialization, both of administration and direct service, which, in spite of its apparent quantitative adequacy, makes for definite lapses in service. Coördination of the public health nursing services of this community might well overcome these disadvantages, and gain the added advantage of releasing some of the present personnel for services in more needy and inadequately served communities.

When this N.O.P.H.N. survey, made in coöperation with the Metropolitan Life Insurance Company, the U. S. Public Health Service, the U. S. Children's Bureau, and the American Red Cross, is completed, it is hoped that besides showing how public health nursing is administered at the present time in places where no organized resources for care of the sick in their homes exist, it will be possible to suggest patterns of coördination for these and similar communities which if adopted will provide a service more comprehensive in scope and more equitably distributed in accordance with actual need, including nursing service to the sick in their homes.

Because guidance has been sought by many communities and agencies as they have become aware of the necessity for introducing immediate measures to compensate, at least in part, for the depletion of personnel, the N.O.P.H.N. has obtained information from numerous local sources in regard to what has already been done, what plans are under way, and what more needs to be done and can be done. This will form the basis of a statement on essential public health nursing services in wartime, which the N.O.P.H.N. expects to publish presently.* When summed up, this information shows fairly definite and uniform directions.

First, it is generally agreed that community analysis of public health nursing seems a logical first step—an analysis in which all agencies responsible for any part of this service will participate. Such an analysis might well be initiated by a local nursing council for war service.

Consideration then needs to be given to the type of coördinated administration best adapted to the particular community. In some instances, a merger of the voluntary agencies providing public health nursing services may be the answer, whereas in others, it may be a matter of agreements between voluntary and governmental agencies whereby personnel and facilities are interchanged. In some communities, the combining of voluntary and official agencies may be feasible. In this case, a single governing body, representative of the individual agencies and including wider representation as well, would need to be established.

Whatever plan for administrative coördination is decided upon, certain measures can be introduced immediately, for instance—

All public health nursing administrators, supervisors, and instructors, can join a common pool for redistribution of their services over the total number of public health nurses employed in the community for direct service, and the paid and voluntary auxiliary workers. An adequate supervisory and teaching staff is particularly important in wartime because of the larger proportion of auxiliary workers and of less experienced field nurses.

All field nurses employed in the community for direct service can also be pooled—each of them to be assigned for general services to families of a given district. As a first step toward economy of personnel, direct services by a variety of specialized workers should be eliminated.

Opportunities for all public health

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nurses in the community, regardless of former agency affiliation or special type of service, to prepare themselves for general service, including care of the sick and injured, can be provided through refresher courses.

Community mobilization of non-public health nursing personnel for all functions that do not absolutely require public health nursing training and experience, and which can be performed under the supervision of public health nurses, is quite generally under way. Both nursing and non-nursing, paid and volunteer personnel, are being considered in this connection. The value of these workers obviously depends greatly upon the provisions made for their in-service training and supervision.

Within each agency, too, adjustments can be made which will help to utilize more fully the public health nurses who remain. Modifications in administration which are being quite generally introduced are as follows:

GENERALIZATION OF DIRECT SERVICE BY EVERY PUBLIC HEALTH NURSE IN THE AGENCY

Provision for in-service education are especially important during wartime because the better prepared and more experienced staff nurses will have more responsibility for the supervision of the less experienced staff nurses and auxiliary workers. For this, they will need to be prepared on the job.

Decentralization or centralization of administration and service, depending upon the size of the community, transportation facilities, etc., is being studied by public health nursing agencies to discover which is more economical.

In some large urban communities, agencies employing a large number of nurses have concluded that setting up branch offices or sub-stations for less than 8 or 10 nurses is uneconomical because of the added cost of maintenance.

In more rural or smaller urban communities where fewer public health nurses are employed, but where transportation is a significant factor, there is a trend toward greater decentralization, both for administration and for service.

Naturally, the more uses to which a branch or sub-station can be put, the greater the economy. Medical clinics, nursing conferences, and group instruction, supervision and in-service training of regular and subsidiary staff, and services to individuals to reduce the number of home visits, are all activities that can be conducted in branch offices or sub-stations. Reduction in the number of times that nurses report to their offices is also an item in time saving.

The use of auxiliary personnel has been mentioned already in connection with community organization. Assignment of auxiliary workers, paid or volunteer, nurses or non-nurses, to any particular group, either according to diagnostic, economic, or other status, should be avoided. Work should be assigned only on the basis of the particular condition of the patient or the particular situation in the home.

Selection of cases for nursing service is particularly necessary when economy of public health nursing has to be practised as rigidly as it does during wartime. Selection should be considered at the time when the individual is referred for or seeks care and when continuation of care is planned. Securing the most pertinent information from the patient at the time when admission for care is under consideration and periodic review, both medical and nursing, of long-term cases such as tuberculosis contact, latent syphilis, and chronic conditions of many kinds, are, among others, significant factors in the mechanics of selectiveness.

Group instruction and service need to be substituted for individual service in

the home wherever possible. There are several types of service where instructions and demonstrations can be given to groups; for instance, tuberculosis, maternity, child care, home nursing and care of the sick, diabetes, heart disease, and rheumatic fever. Group education can well be directed to those responsible for care of children in day centers or foster homes, and to groups of industrial workers. Certain kinds of nursing treatments can also be given at centers at specified times to several persons instead of making visits to homes of individual patients.

More delegation of responsibility to the family will make it possible for public health nurses to devote themselves more and more to teaching and to supervising care given by others. In the home, members of the family, relatives, and neighbors will be prepared for performing many nursing functions under the supervision of qualified public health nurses, which have hitherto been given by professional nurses. Although this has long been considered desirable, it has not been put into practice as widely as necessity now demands. Assumption of more responsibility for health services presupposes education of the family by the public health nurse in the intelligent use of community health facilities.

Review of medical policies, standing orders, and outlines of work needs to be undertaken with the medical advisory

group at reasonably frequent intervals. In some communities, because of shortages of medical personnel, standing orders need to be enlarged and extended when it becomes necessary for public health nurses to give certain types of care, treatment, and instruction which were formerly given by physicians.

Recording and reporting, if simplified to the utmost, will save considerable time and effort of public health nursing personnel. The elimination of nonessential record items, avoidance of duplication of information, and streamlining of report and records systems, are all involved. As many activities as possible connected with the keeping and filing of records and reports should be delegated to clerical or auxiliary personnel. Uniformity of records and reports will prevent duplication, delays, and confusions.

Organizational and administration procedures such as these will suggest a great many others, which, if systematically applied, will prove effective in spreading the services of public health nurses as widely as possible. It is obvious that our peacetime standards can neither be retained nor attained during wartime, but I for one am convinced that if everything we have learned about public health nursing administration through our peacetime experience of the last 10 or 20 years is now consistently and universally applied, great economies of personnel can be achieved without too great a sacrifice in quality of service.

An Outbreak of Typhoid Fever Due to the Small Colony Variety of *Eberthella typhosa**

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IN September, 1940, an outbreak involving 13 cases of typhoid fever occurred among a family group of Negroes in a rural area of Twiggs County, Ga. Laboratory investigation revealed the causative organism to be the small colony variety of *Eberthella typhosa*. Clinically no significant peculiarities could be detected. There were two fatalities.

While epidemiological investigation failed to reveal a carrier source of this outbreak, it was later found that one of the family (Mamie G.) visited an unrelated home 8 miles distant in July. In this home were two children critically ill with fever. Both died on the 10th day after onset. A physician who was not called until just before the children died made a tentative diagnosis of "colitis." Two weeks later Mamie G. developed an illness which was not diagnosed by her physician. About 1 month later 13 others in the family became ill. It was not until then that laboratory studies were begun, and a diagnosis of typhoid fever was established and confirmed. It thus appears evident that the epidemic can be traced to the two children who died in July. Beyond this

point no definite information could be obtained.

Sporadic occurrence of typhoid fever due to a small colony variety of *E. typhosa* has been recognized in Georgia over a period of 6 years prior to this outbreak. From 11 patients the small colony variant was isolated 22 times from blood, feces, urine, and sputum.¹ No significant relationship of these cases was established.

While literature contains a few references to the isolation of the small colony variety of *E. typhosa* from blood and feces,^{1, 2, 3} only one report involved such isolations from an epidemic. In 1910, Jacobsen² reported an outbreak of typhoid in an insane asylum in Denmark. From 50 blood and feces cultures he obtained only 2 isolations, 1 from blood and 1 from feces. These were of the small colony variety. In a recurrent outbreak in the same institution 4 months later he isolated the small colony variant from 2 convalescents. It is reasonable to infer that this epidemic was entirely due to the small colony variety of *E. typhosa*.

Cultural characteristics of the small colony variety differ from those of typical strains of *E. typhosa*, (a) in the size of the colonies on extract and beef infusion agar, and (b) in their reaction on Russell's double sugar slants (acid

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butt and acid slant with very small colonies). On extract and infusion agar the colonies average 0.2 and 0.3 mm. in diameter after 24 to 48 hours' incubation, but grow to a diameter of 1 to 2 mm. on agar containing utilizable sulfur, such as Endo's and bismuth sulfite plating media or Kligler's iron agar slants. Cultures of the small colony type, plated on plain agar, produce after several days' incubation a few large colonies which grow up among the small colonies, but which, on subculturing, do not revert to the small colony type. A few large colonies may also appear simultaneously with the small colonies on agar inoculated from broth cultures. It is difficult to maintain the small colony subcultures free of large colonies.

No evidence was found that this small colony phenomenon had any influence on normal antigenic behavior. Large colony substrains descending from small colony parents likewise seem to be antigenically similar to parental and to normal strains. By application of the bacteriophage typing method of Craigie and Yen⁴ all strains isolated in this study were found to belong to Type E.

This outbreak afforded an excellent opportunity of observing the persistence

of the small colony form in repeated stool culture examinations. Table 1 shows the number of isolations from each patient.

The significance of the small colony variant of *E. typhosa* is yet to be determined. However, the scanty growth on solid media not containing utilizable sulfur could well result in failure of recognition. Especially is this true when applied to Russell's or Krumwiede's sugar slants. On these media the colonies are very minute, and both butt and slant give an acid reaction which persists for several days or longer. By one unacquainted with these reactions such cultures are apt to be discarded. There is no reason to believe that small colony variants of *E. typhosa* are peculiar to Georgia, or any geographical section. It is advisable, therefore, that enteric bacteriologists include in their armamentaria one or more plating media containing sodium sulfite or its equivalent.

SUMMARY

A small epidemic of 13 cases of typhoid fever due to the small colony variety of *E. typhosa* is described.

The outstanding cultural characters

TABLE 1
Showing the Persistence of the Small Colony Variant of *E. typhosa* in
Repeated Stool Cultures

| Patient | Age | Sex | Blood Culture | Results of Stool Cultures | | | | | | | | | | | |
|---------|-----|-----|---------------|---------------------------|--------|---------|---------|---------|---------|--------|---------|---------|---------|--------|---------|
| | | | | Oct. 1 | Oct. 8 | Oct. 12 | Oct. 14 | Oct. 22 | Oct. 29 | Nov. 5 | Nov. 12 | Nov. 19 | Nov. 26 | Dec. 3 | Dec. 10 |
| H.T. | 2 | F | None | + | + | + | + | + | + | + | + | + | + | + | + |
| J.R.G. | 2 | M | None | + | + | + | + | + | + | + | + | + | + | + | + |
| M.G. | 4 | F | Pos. Sept. 23 | + | + | + | + | + | + | + | + | + | + | + | + |
| W.T. | 7 | M | Pos. Sept. 23 | + | + | + | + | + | + | + | + | + | + | + | + |
| J.T. | 8 | M | Pos. Sept. 23 | + | + | + | + | + | + | + | + | + | + | + | + |
| L.T. | 9 | F | Pos. Sept. 16 | + | + | + | + | + | + | + | + | + | + | + | + |
| L.T. | 11 | F | Pos. Sept. 23 | + | + | + | + | + | + | + | + | + | + | + | + |
| J.T. | 11 | F | Pos. Sept. 16 | + | + | + | + | + | + | + | + | + | + | + | + |
| R.T. | 13 | F | Pos. Sept. 23 | + | + | + | + | + | + | + | + | + | + | + | + |
| L.M.T. | 15 | F | Neg. Sept. 16 | + | + | + | + | + | + | + | + | + | + | + | + |
| W.P.T. | 16 | F | Neg. Sept. 24 | + | + | + | + | + | + | + | + | + | + | + | + |
| F.T. | 19 | M | Pos. Sept. 16 | + | + | + | + | + | + | + | + | + | + | + | + |
| M.T. | 45 | F | Pos. Sept. 16 | + | + | + | + | + | + | + | + | + | + | + | + |

* Unsatisfactory specimen

† Died Sept. 26, 1940

‡ Died Sept. 21, 1940

of the small colony variety of *E. typhosa* are reviewed.

It is suggested that to insure the detection of small colony variants of *E. typhosa*, laboratories engaged in enteric bacteriology employ plating media containing utilizable sulfur.

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Nutritional Needs of American Youth^{*}

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IN the past the diet of persons at certain ages or periods regarded as critical has been of special concern. Most energy in diet education has been focused and expended on the expectant mother, nursing mother, infant, and child. Actually, proper nutrition is important at all ages. That utterance has long been such a commonplace that its full import became much depreciated. Recent findings, however, have imparted to it such a newer and deeper meaning that nutrition of the adolescent, adult, and senescent, no less than of persons at the other ages and periods which up to now have so largely preëmpted our concern, take on a new importance. Accordingly, most of what I have to say applies to all ages. But I shall mention some matters that apply especially to youth, and make that period of particular significance.

In speaking of nutritional needs it is not my intention to review, one by one, each of the nutrients necessary for growth and prevention of deficiency diseases since they are familiar, in greater or lesser measure, to all of you. Rather, it is my purpose to comment on the nutritional condition of our people, and to suggest what needs to be and what may be done.

CHRONIC FORMS OF DEFICIENCY DISEASES

Several surveys in the various sections of our nation have shown the prevalence

of dietary deficiencies to be relatively high. Yet physicians have insisted that they rarely or never see deficiency diseases. For some time this has seemed to be an insolvable discrepancy, but it now turns out to be no contradiction whatsoever. By the notions of deficiency diseases which have prevailed, the physicians are quite correct in their assertions. But these notions, since they are exceedingly narrow, do not cover actual existing conditions. In speaking of deficiency diseases, physicians have been thinking of the severe acute form. Until recently none other was recognized. Almost all the medical literature bears only on the severe acute form. Nearly all animal experimentation has been aimed toward its production. Actually, there is relatively little of the severe acute condition in this country. There is much deficiency disease but it is in another guise.

Recently it has been demonstrated that there is widespread prevalence of deficiency diseases, not in the severe acute, but in new forms. It has been found that they are very prevalent in a chronic form. In biological behavior the chronic differs from the acute; whereas the acute is rapid, the chronic is slow in development and slow in response to treatment. Both the acute and chronic processes may be of any intensity from mild to marked. Much is of marked intensity. In brief, deficiency diseases have been demonstrated as widespread in previously unrecognized forms: mild acute, mild chronic, and severe chronic. Furthermore, the acute and chronic may

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be present together. Indeed, the most usual state is an acute, superimposed on a chronic condition. Each may be in a different stage and of a different intensity. Let me emphasize that this refers to each kind of deficiency disease.

Time is a factor in the evolution of both these forms; but it is particularly important in the development of the chronic process. For us, time is age. The prevalence and severity of these chronic processes increase with age. Most of the chronic changes have been regarded mistakenly as characteristic of senescence. Actually, however, they are deficiencies developing slowly over a lifetime. These chronic processes may be seen beginning in childhood. The lower the economic level the more frequently, the more severe, and earlier in life they occur. A boy of 12 in a low economic group may show changes in stages not usually seen in higher economic groups until late in life.

These facts indicate that our past efforts to stamp out malnutrition have as yet fallen short, in many instances far short, of perfection in performance. Further, they show the nature of malnutrition actually present in the population. To know and to appreciate this situation is a long step toward mapping appropriate measures to cope with it. But, beyond this, the new facts alter our outlook on the ways to improve existing nutritive conditions. It is appropriate, therefore, to examine the measures which have already been taken, and to modify and reshape them, where necessary, according to new views. We may have to prepare to take steps in a new direction. The problem is twofold: it is necessary to correct and to prevent.

CORRECTION OF DEFICIENCY STATES

In correction, the first step is examination of persons for appraisal of their nutritional status, for detecting deficiency states. It is necessary to locate in a community the areas presenting the

most prevalent and severe malnutrition, to identify the deficient persons, and to determine the nature of the deficiencies. When widespread deficiencies can be demonstrated, the health organization with limited personnel and funds can justify concentrating its resources on malnutrition. Usually, a health organization seeks to focus its activities on the worst areas where the need is greatest. Then too, if malnutrition is to be combated, the malnourished individuals must be identified and their deficiencies detected. Here again, the most severe nutritional cases, requiring the most effort, should be the first point of attack. In such a program of correction, the service that the private practitioner is in a position to render should not be underestimated. Most people consult the clinician professionally at some time during their lives.

Little has been done in examination and detection in the immediate past, except diagnosis of severe acute deficiencies in some hospitals. In schools, the height-weight measurements of children, which used to be conducted routinely, fell into disrepute and discard as an index of nutrition. Then followed a period in which no examinations for nutritional status were made. Now new methods are available for detection of deficiency diseases in their acute and chronic forms in any stage and degree as a means of evaluating nutritional status. At present the bottleneck is the training of personnel in these new methods. In the present unsettled and disrupted conditions, with shortage of medical personnel in civilian practice, and interruption to the supply of examining equipment, plans for training personnel may have to proceed much more slowly and on a smaller scale than in more peaceful times. It may have to await the war's end for full development. But at least the plans may be laid, and a start may be made on small-scale operation.

With the identification of the individuals with deficiency states and the nature of their deficiencies, specific therapy should be administered to them. Malnutrition is a medical problem requiring specific treatment. Unfortunately, in the past, two doctrines, entirely inadequate and misleading in principle, have been disseminated. It has been taught that change to an optimum diet is all that a person needs for correction of his deficiency states. It was implied that conversion to a good diet would correct effects of previous errors promptly and completely. It is true that the diet should be corrected: for one thing, to supply the necessary basal level of all dietary essentials; and for another, to form, restore, or inculcate proper dietary habits which will sustain the person in the future and prevent the recurrence of deficiency states once they are corrected. But specific therapy is needed for complete and effective treatment of deficiency states.

The second viewpoint has been that deficiency states respond dramatically and quickly to therapy, and that a few days' or few weeks' therapy is sufficient. That is true for the severe acute forms, the classical textbook conditions. With them, the results are often quite spectacular. But relatively few such forms occur. Most deficiency states are mixed, acute superimposed on chronic. In treating them, the symptoms of acute process vanish promptly under therapy; then the tissue changes characteristic of the acute form next disappear. The chronic lesions recede not in a few days or weeks, but only after a very long time—several years for advanced states. Clearly, the therapeutic regimen must conform to these facts.

In view of these facts, it is clear that chronic deficiency states which start in youth should be corrected then, before they have advanced to late stages where the necessarily long period of therapy makes it a more difficult, laborious, and

expensive problem to carry it to completion. Moreover, the earlier the states are detected and corrected, the earlier interest is aroused in keeping free of these states by proper diet.

These deficiency states, moreover, are accompanied by unpleasant and handicapping symptoms. Also, there are strong indications that these states developing insidiously predispose to more serious, overshadowing diseases. With new tools we are on the threshold of testing that hypothesis. If it is found to be true, the earlier the deficiency states are corrected, the less should be morbidity and premature mortality. It is not fanciful to presume that prompt correction of deficiency disorders, adding very considerably to the number of years in excellent nutrition, would bring a healthier, happier, and longer life.

PREVENTION OF DEFICIENCY STATES

It is necessary, not only to correct, but also to prevent deficiency states. Either step alone, would constitute an incomplete program. Because correction is so expensive, it is especially important to stress prevention. Once deficiency states in a person are corrected, it is essential to prevent recurrence. Better still, it should be the goal to prevent these states from ever occurring. That emphasizes the necessity of starting the preventive work early in life, and underscores the work with youth. Much of this preventive work takes the form of education in proper dietary habits. One of the outstanding effects of finding chronic malnutrition so prevalent is the impressive realization that diet education has an even greater importance than has previously been appreciated, that it must be extended to the utmost, and that it must be raised to new heights of effectiveness.

In view of our new insight into conditions and the greater significance to be attached to diet education, it would be wise to consider whether the program

as conducted at present will satisfactorily fulfil its purpose. Our new conception of the problem may call for a new rationale and design of action. In the past it has been emphasized that poor diet resulted in deficiency diseases. Always was visualized and meant the severe acute forms. Up to now growth and prevention of these forms of deficiency diseases have been the inducements to take an adequate diet. But, inasmuch as these severe forms have so seldom been seen, the incentive must have lost some of its edge. Prevention of diseases seldom seen is not a strong incentive to eat proper diet. Our people should be told that their present faulty dietary habits lead most frequently to insidious, chronic malnutrition, often with periodic exacerbations.

Then too; although the necessity of a good diet every day for a lifetime has been taught, it has not perhaps been sufficiently impressed. The gravity of slight dietary deficiencies prevailing for years has not been emphasized. This is understandable since, until recently, ill effects were unrecognized. Now we know that these effects do occur, that they are very widespread, and that they are cumulative over the years. These chronic and slight acute forms, not the severe acute, constitute our malnutrition problem. Since there is likely to be more concern about preventing a strong probability, or almost certainty, than a more remote possibility, there should be more of an incentive to avert the chronic and mild rather than the severe acute states. It is clear that unless an adequate diet is taken continually, these chronic and mild conditions appear. But, as diet educators must realize and point out, it is difficult to adhere to a perfect diet throughout life. They must emphasize that a lapse for a short or protracted period does leave its mark; that because it is so difficult to observe good dietary constantly, deficiency states are extremely prevalent; that a satis-

factory diet must be taken regularly to prevent not only severe forms but more likely the low-grade chronic forms. Or, to put it more simply, an adequate diet must be taken faithfully day after day to insure health.

We must not fail to recognize and admit that under the best circumstances diet education presents difficulties. So insidious is the development of these deficiency states that many persons actually affected with them and manifesting disturbing signs, declare that they feel all right and become aware of their under-par condition only after specific therapy has brought improvement. It is not easy to convince such untreated persons or normal persons of the virtues of a good diet. It is always difficult to preach and promise better health to persons who already regard their present condition, to which they are accustomed, as perfect health. Furthermore, even if such a person is persuaded to better his dietary habits, it is not easy to retain his continued interest. Under the present motivation in diet education, he is led to expect from his changed diet improvements in health which he never realizes or receives.

NEW STRATEGY IN NUTRITION EDUCATION

New strategy in diet education is needed; a new turn should be given to old methods, or entirely new approaches should be tried. I leave the working out of plans and methods to qualified specialists, but I may mention several observations suggesting appropriate and effective lines of action. With accent on youth, on training in proper dietary habits in early years, much more work in the schools is needed. Besides examination system and correction of deficiencies, the curriculum should contain considerable diet education. Second, when coupled with correction of deficiencies by therapy, diet training may be much more effective. Very often

correction by therapy has educational value. It stirs and cultivates interest in diet. When the person experiences the rather prompt benefits in relief of symptoms, he is in a receptive mood for diet education; indeed, he is very frequently activated to seek it. Very often he becomes extremely interested, curious why he was deficient, and is in the proper frame of mind to take his dietary habits seriously. Thus, by utilizing this shift in viewpoint, by fitting it into the program, the effectiveness of nutrition teaching may be greatly enhanced.

Third, the school lunch should be conducted according to dietetic principles. It is with no sense of satisfaction that we learn from surveys that many school lunches are far from satisfactory, and that children who have partaken of them for several years show definite evidences of deficiency states. This raises the question of what may reasonably be expected from the school lunch system. If it is supposed to supply most or all of the day's requirements and to confer complete protection, it is falling far short of the mark. Indeed, that should not be expected, for it is virtually impossible for one meal of natural food, especially a light meal, however carefully planned, to provide the day's needs. If it is supposed to supply what might reasonably be expected in one meal, to be a dependable and potent supplement to the other meals, in short, if it is supposed to supply one good meal a day, no more or no less, in too many instances it is not achieving this more modest and reasonable aim. Its primary purpose should be to serve as a model meal, besides actually supplying part of the day's needs. Through its inculcation of good food habits, the lunch has a place in diet education. But, whatever its function, the lunch system should purvey an adequate meal. To insure this, lunchroom concessionaires should have the benefit of dietary advice and tutelage. Far more lunches are

faulty from ignorance than from greed for excessive profit.

Along with new attempts at diet education, whatever the approach, new or old, we should periodically appraise the methods of application. We should not look for unwarranted approval, especially we should not develop a weakness for panegyrics and fulsome flattery. If our methods are not producing results, we should find it out and change our approach.

Still another point is the proper preparation of food. Of food it may be said as aptly as it was of newspapers, that Greeley made virtue so dull in the *New York Tribune*, while Dana made vice so interesting in the *Sun*. Likewise, a meal scientifically correct in every detail may be a tasteless and unappetizing agglomeration. How many persons have shunned some highly nutritive item because at first encounter it was improperly prepared? Of no less importance in the preparation of food is the retention of its nutritive properties. We are just beginning to realize how severe are the losses in vitamins in foods during their preparation.

It is easy to understand the widespread prevalence of chronic deficiency states when we consider the development of tastes through the centuries for natural foods of limited nutritive value and for refined and processed foods, and the losses in preparation in the home. We come to realize how difficult it is to meet requirements always from usual foods day after day, how easily slight deficiencies are incurred over the years resulting in insidious nutritive changes, how close many persons constantly are to more serious conditions. For protection in these narrow circumstances, we have the possibilities of heavy and exclusive dependence on the absolute effectiveness of diet education in attempting to convert radically the fixed dietary habits in our nation, or the enrichment of certain foods to the point

where compositely they allow a margin for safety. As we ponder the magnitude as well as the serious implications of the situation, it seems highly questionable that we should place sole reliance on diet education. Rather, it seems advisable that we take all available and promising steps. Judicious enrichment of appropriate foods adds much to the guarantee of successful nutrition.

NEED FOR RESEARCH

For protection of youth there should be continuance of basic research on foods, as well as on diagnosis and pathogenesis of deficiency diseases, and their possible predisposing influence to other disease. We must never forget that our present advanced position of enlightenment came from painstaking and prodigious research. In this there must be no letdown in so far as it does not draw upon resources needed more urgently for other purposes in our present titanic struggle for life on a human plane. As a matter of fact, newly discovered facts about nutrition constantly streaming from our research laboratories are of incalculable usefulness in the war effort, as well as for the new world of our making that is to come.

THE ECONOMICS OF THE PROBLEM

Another important aspect of nutrition, especially in the provision of an adequate diet, is economics. Obviously, this problem with its solution is international in scope. It is reassuring to note that our government, alert to both its responsibilities and potentialities of effective action, has made definite headway in this exceedingly complex and intricate field. Following this start, it may be expected that continued careful planning, both on the part of official and unofficial agencies, will be directed toward productive results, not the least of which is benefit to health.

For the whole of nutrition there are needed an attitude, organization, and

program that encompass its many aspects. To achieve joint action, it is necessary to have breadth of outlook, wide-angled vision. It is time to forsake the narrow for the broad view. No other science cuts across so many specialities. By the same token, it requires the concerted endeavor of all. The expert in one branch should not underrate or overlook the strong force which his speciality may exert against malnutrition. Yet, he must not have an exaggerated sense of sovereign powers of his field. I have talked with physicians who have said: "Malnutrition is only an economics problem." Perhaps some economists share that view. On the other hand, by their attitude, some in the health field seem to proclaim that nutrition is only a matter of education. In truth, it is a matter of economics, agriculture, food technology, education, medicine, public health, chemistry, and physics. Its application should extend to all people of all ages and in all activities.

When the branches of nutrition are viewed in their proper perspective, there is no natural rivalry between groups. For example, there is no basis to raise a false issue over food versus vitamin therapy, as if they were alternatives and a matter of choice when actually each has its own particular place in which it is indispensable and irreplaceable. Food industry and drug houses, aside from their own gain, can be more effective in concord than in rivalry. Physicians should not only diagnose and treat, but should seize the opportunity of advancing diet education. Diet experts, besides conducting their educational activities, should take cognizance of the need for therapy for deficiency states. Then too, in the organization for concerted action, no one special group or interest should be supreme, for none could adequately represent all aspects. Until we can find the formula for consolidated action, we cannot expect to bring our tremendous

strength to bear on the problem and to strike with a mighty impact.

Finally, it is not enough to stir willing workers to action if they are not given a plan. For effective results, an aroused spirit and enthusiasm must have sound direction. We must decide what to do and how to do it. Here, above all, we need ideas which are feasible and promise fruitful results. The need to improve

existing nutritive conditions is a challenge to our ingenuity.

In the last few years we have made remarkable progress along the several lines. Never before were we in such a favorable and potent position to carry on effective activity on all fronts. But we have scarcely made a beginning. The nutritional status of our youth will reflect how successful we are in our efforts.

U. S. Chamber of Commerce Organizes Health Advisory Council

The Chamber of Commerce of the United States in Washington announced on February 5 the creation of a National Health Advisory Council to project and carry out a broad program looking to health conservation as an important factor in winning the war.

The National Health Advisory Council will serve to channel approved technical health information developed by the country's sources of scientific study through the business organizations and their members throughout the country so that there may be encouraged a better public understanding and appreciation of medical science as a means of safeguarding public health to win the war.

James L. Madden of New York, N. Y., Vice-President of the Metropolitan Life Insurance Company and Chairman of the National Chamber's Insurance Department Committee, is in charge of the program.

The Council has as its general chairman James S. McLester, M.D., Professor of Medicine at the University of Alabama, Birmingham. Three com-

mittees covering community health, industrial health, and individual health, have as chairmen Wilson G. Smillie, M.D., Dr.P.H., Cornell University Medical School, New York, N. Y.; Leverett D. Bristol, M.D., Dr.P.H., American Telephone and Telegraph Company, New York, N. Y., and James E. Paullin, M.D., Professor of Medicine, Emory University, Atlanta, Ga., respectively. Other persons whose membership in the Council was announced included J. Burns Amberson, M.D., New York, N. Y., George Kosmak, M.D., New York, N. Y., Ernest L. Stebbins, M.D., New York, N. Y., Felix J. Underwood, M.D., Jackson, Miss., Bailey Burritt, New York, N. Y., Henry F. Vaughan, Dr.P.H., Ann Arbor, Mich., Philip Drinker, Boston, Mass., A. J. Lanza, M.D., U. S. Army, Washington, W. A. Sawyer, M.D., Rochester, N. Y., Harry E. Ungerleider, M.D., New York, N. Y., Leroy Gardner, M.D., Saranac Lake, N. Y., Russell Wilder, M.D., Rochester, Minn., Marion G. Howell, R.N., Cleveland, Ohio, and Harold M. Marvin, M.D., New Haven, Conn.

Attitude of the Nation Toward Immunization Procedures^{*}

A Study Based on a Public Opinion
Poll Made in 1941

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IT is well recognized that wars always increase the hazard of spread of communicable disease. In the present one, in which civilians are so largely involved, certain conditions productive of epidemics may prevail to a greater extent than formerly. Even in as yet an uninvaded country like our own, mass movements of populations to defense plants add a new hazard to the usual one of bringing relatively non-immune rural populations into army centers. Shortages of medical personnel for our armed forces and civilian population are becoming more apparent daily, so that it is of utmost importance that all needless illness be cut to a minimum.

In the armed forces, active immunization to those diseases for which protection can readily be given is easily accomplished, but no such compulsory measures are practical among civilians. It is, therefore, of great interest to study the attitudes of the public toward immunization. Are they ready for such measures? What do they know of them? Do they know when, how, and against what to be immunized? Some of these questions it is now possible to answer as a result of a nation-wide poll taken in September, 1941.

METHOD

A field staff, well trained in technics of interviewing, presented specific questions on immunization against certain diseases to persons scattered over the entire United States. In selecting those to be interviewed, the usual methods used in conducting such surveys^{*} were employed so that an adequate sample of the total population under consideration was secured. Only the adult white population was sampled. Those interviewed were classified according to geographical location (nine divisions of the country), the size of the community (six divisions, including rural populations), economic level (four income groups), age (two groups), and sex. The percentage distributions of the sample and of the general population were identical for each of these criteria, as can be seen in Table 1.

What Is the Prevailing Opinion Concerning Immunization Procedures?

First, interviewers asked, "In your opinion can a person be prevented from

^{*} The survey was conducted by the Elmo Roper organization, probably best known for the public opinion polls it has conducted for *Fortune* magazine. The samples chosen by them have often been proved to represent adequately the opinion of any group under consideration, and in this study they have tested the reliability of the samples chosen. In no instance have data been presented or conclusions been drawn from any sample in which there was not a sufficiently large number of answers to make the data or conclusions statistically significant, unless so stated in the text.

^{*} Presented before the Health Officers Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

TABLE 1
Distribution of Interviews

| <i>Geographical Divisions</i> | <i>Per cent</i> | |
|-------------------------------|-------------------|-------------------|
| | <i>Interviews</i> | <i>Population</i> |
| New England | 6.4 | 6.4 |
| Middle Atlantic | 21.8 | 21.8 |
| East North Central | 20.6 | 20.6 |
| West North Central | 10.7 | 10.7 |
| South Atlantic | 12.8 | 12.8 |
| East South Central | 8.0 | 8.0 |
| West South Central | 9.9 | 9.9 |
| Mountain | 3.1 | 3.1 |
| Pacific | 6.7 | 6.7 |
| Total | 100.0 | 100.0 |
| <i>Size of Place</i> | | |
| Over 1,000,000 | 12.6 | 12.6 |
| 100,000 to 1,000,000 | 17.2 | 17.2 |
| 25,000 to 100,000 | 10.1 | 10.1 |
| 2,500 to 25,000 | 15.8 | 15.8 |
| Under 2,500 | 8.9 | 8.9 |
| Rural | 35.4 | 35.4 |
| Total | 100.0 | 100.0 |
| <i>Economic Level</i> | | |
| <i>Class Income</i> | | |
| A—well to do | 6.8 | 6.8 |
| B—upper middle | 24.7 | 24.7 |
| C—lower middle | 45.5 | 45.5 |
| D—lower | 23.0 | 23.0 |
| Total | 100.0 | 100.0 |
| <i>Age</i> | | |
| 21-39 | 50.0 | 50.0 |
| 40 over | 50.0 | 50.0 |
| Total | 100.0 | 100.0 |
| <i>Sex</i> | | |
| Total Women | 50.5 | 50.5 |
| Total Men | 49.5 | 49.5 |
| Total | 100.0 | 100.0 |

getting ——— by being inoculated or vaccinated against it?" Table 2 shows the relatively large numbers who accept the value of such protective measures for diphtheria, smallpox, and typhoid fever, the three diseases for which public health officials most often advocate artificial protection. Those persons who said they did not believe that the dis-

eases could be prevented by specific immunizations were allowed to make voluntary comments after their "yes" or "no" answers had been recorded. Of those who had answered "no," about 60 per cent believed that, because of immunization, a person will have milder forms of the diseases—indicating an even wider acceptance of the procedures than indicated in the "yes" and "no" answers. An additional 18 to 20 per cent felt it might be effective or help in some cases. Only 9 per cent took the fatalistic attitude that "if you're going to get it you're going to get it." There is, thus, apparently little active *disbelief in* or *resistance to* vaccination or immunization. Still let us not forget that 12 per cent do not know if vaccination will protect against smallpox and that larger percentages do not know of protection against diphtheria and typhoid fever.

Do People Believe These Diseases Are Serious?

Respondents were asked to agree to one of a series of specific statements about the seriousness of each of the diseases, and their answers indicate that they understand the nature of the diseases and believe them sufficiently serious to cause concern. It is interesting that they apparently feel smallpox to be less dangerous than diphtheria or typhoid fever. If a lack of understanding of the nature of the disease cannot seem to be the reason why persons are not immunized, what other factors may prevent their being artificially protected?

Are People Deterred from Securing Protection against These Diseases Because of Any Specific Drawbacks?

Answers to this question showed that, in the minds of most persons, there are no serious drawbacks to immunization procedures, 85 per cent stating that there are none or that they know of none. They seem not to differentiate

TABLE 2

*Opinion of Respondents Concerning Preventive Value of
Immunization Measure against Specific Diseases*

| | <i>Typhoid Fever</i> | <i>Diphtheria</i> | <i>Smallpox</i> |
|----------------------------------|--------------------------|-------------------|-----------------|
| Number of respondents | 3,047 | 3,051 | 3,038 |
| Per cent believing immunization: | % | % | % |
| Does prevent | 65 | 72 | 77 |
| Does not prevent | 14 | 12 | 11 |
| No opinion | 21 | 16 | 12 |
| Total | 100 | 100 | 100 |

much between the measures which protect against the three diseases, except to feel that vaccination is more dangerous than the others.

It should interest those who are concerned with promoting immunization that only 2 per cent of respondents felt such procedures were too expensive or too much trouble. Nor did a history of previous immunization change their opinions. Those who stated that they had been artificially protected volunteered slightly more information concerning the pain or discomfort involved than those who had not, but in general they saw fewer drawbacks.

Thus, the average white adult in the United States finds no specific drawbacks connected with being protected against these three diseases—and his states of readiness to accept all forms of immunization are strikingly the same. Moreover, when asked, 50 per cent of those who had not previously been protected stated that they might be willing to be. Mothers* of unimmunized chil-

dren were even more willing to have their children protected, for over 80 per cent of them answered affirmatively a similar question referring to their children.

What Do People Know About When to Be Immunized?

The public for the most part seems ready for immunization procedures. Do they know when such action should be taken? An answer may be derived from several of the questions asked respondents in the survey. Those who said they might be willing to be inoculated or vaccinated against diseases they have not had or have not been immunized against were asked, "Under what conditions or at what age would you be inoculated or vaccinated against ——?" Results showed that most of these persons apparently think immunization is necessary only upon exposure.

A similar question was also posed to "mothers" who might be willing to have their unimmunized children protected. Here the picture changes somewhat. A large number still believe in protection only on exposure, but more important is the fact that they believe that 6 years of age is the proper time to protect children against smallpox and diphtheria. Only 3 per cent stated that they would have their children protected before 1 year of age. It is discouraging to remember that, both in the 1930 White House Conference Report¹ and

* "Mothers of children" are defined as those persons who are, in fact, mothers plus those persons who, regardless of sex, are guardians or persons-in-charge of children. In the classification "mothers with children under 5 years old" are included the answers of persons with children both under and over 5, while in the class "mothers with children over 5 years old" are included answers of mothers all of whose children are over 5 years of age. It is not possible to state if the so-called "mothers" represent an adequate sample of the "mothers" in the population under consideration, for in this one characteristic the sample interviewed could not be matched. It will be remembered that the sexes in the sample were distributed as they are in the general population (see Table 2).

in the survey of 1928 summarized by Collins,^{2,3,4} it was emphasized that there was a tendency to postpone vaccination until school age. It would appear that educational campaigns may well be directed more specifically to this point in the future.

Those who believed diphtheria could be prevented by immunization were asked questions on how often and when one should be immunized. Twenty-five per cent thought one immunization was sufficient; 38 per cent believed more than one necessary; 36 per cent did not know. Although "mothers of children" were better informed, even 25 per cent of them did not know whether one or more than one inoculation were necessary. Add to this the 33 per cent of "mothers" who believe that one immunization is sufficient, and one sees that 58 per cent of those "mothers" who believe in the value of immunization still would probably not be adequately protecting their children if they followed the information they now believe correct.

Of those who felt one inoculation was sufficient, only 41 per cent thought it should be given at 1 year or less, and 17 per cent did not know when it should be given. "Mothers of children under 5" were much the best informed, 72 per cent giving 1 year or less as the earliest age, and only 6 per cent being uninformed. If persons believed that diphtheria immunization was necessary more than once, they seemed uncertain as to when they should be protected, 28 per cent having no idea at all and the remainder volunteering a wide variety of answers. "Mothers" were again somewhat better informed than "non-mothers."

This lack of specific knowledge concerning when to be protected is also emphasized in the answers to the question, "How long does the protection a person gets from inoculation or vaccination against ——— last?" The largest

number (72 per cent for diphtheria and typhoid fever and 52 per cent for smallpox) stated they did not know. Others stated periods from less than 1 month to the duration of a person's life. Few stated periods in accord with the more or less well accepted time limits set by medical experts.

Thus, if the public is to be expected to request the physician to give specific protection against these diseases at the proper time, a great deal of education must still be done, for persons do not know when or under what conditions they should be immunized.

CONCLUSION

In conclusion, it seems important to recognize any factors which could lead to the immediate immunization of as large a percentage of the civilian population as possible. The following generalizations concerning the attitudes of the adult white population in the United States seem justified from the results of a public opinion poll taken in September, 1941.

1. In general the public is aware of the value of immunization against and of the serious nature of diphtheria, smallpox, and typhoid fever, and sees no specific drawbacks connected with being inoculated against them.

2. Over 50 per cent of those who are in need of protection say they might be willing to be protected.

3. The public is not well informed concerning when or how often to be immunized. The importance of having children protected against diphtheria and smallpox in infancy needs particular emphasis.

4. Persons responsible for children are generally better informed concerning immunization procedures than adults not responsible for children.

5. In general, the public opinion is sufficiently favorable toward active immunization against smallpox, diphtheria, and typhoid fever that public health officials and private physicians can well urge such procedures as a routine practice.

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Citizen Support for the Health Officer

EDITOR,

The Plainfield Courier-News

There is a big health job ahead all over the nation. Communities are increasing and expanding health budgets to meet new programs and competent health officials are receiving salaries they deserve. . . .

Now is the time for our City Fathers to consider warnings given over and over again by government officials and medical leaders that dangers are increasing, not only from well known diseases, but from entrance into the United States of strange new diseases. Preventive work, which is the business of the health department, must increase in scope and effectiveness. The health department works to keep individuals from being sick by preventing disease from getting a foothold.

Scientists, doctors, and public health specialists are constantly discovering new effective ways to combat and control diseases, old and new. Our city can utilize their wisdom by giving our health officer a chance to expand actual field work and to expand educational services that enlighten and so protect us.

Already that department has helped the general public to understand and benefit by the protection given by pasteurized milk, cleanliness of food sold in our markets, vaccination, choice of

really nutritious foods, and service of the visiting nurse—to mention a few services we now take for granted.

Last year, Plainfield's general death rate per 1,000 population was 10.0, but Plainfield's infant mortality rate per 1,000 births was 33.2, a jump from 27.1 of the year 1941. Usually infant mortality is considered an excellent gauge of public health. Last year in Plainfield there were 30 deaths of children under one year. The year before (1941) there were 19. Measles, scarlet fever and diphtheria caused no deaths in our city in 1941 or 1942. Cancer caused the death of 60 persons in our town in 1941. Last year's records list 35 cancer deaths. Cancer is evidently far from wiped out.

Obviously splendid work has been done by our Health Department. (How many know that some recent phases of its work are known in public health circles throughout the country and are used as a pattern?) Obviously there will be need for far greater service in 1943. Health services must increase and must be provided for in time of war by allocation of ample funds. This is no time to "wait and see what will happen." It's no credit to a town to have an underpaid health officer and an undersize budget that limits his work—*Courier-News*, Plainfield, N. J.

Variations in Phenol Coefficient Determinations of Certain Disinfectants^{*}

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IT has become customary to gauge the strength of a disinfectant by its phenol coefficient value; and ordinarily the labels of coal tar phenolic type emulsions and similar disinfectants bear phenol coefficient statements to indicate their germicidal efficacy. Unless the label states that some other organism has been used, the phenol coefficient is determined against *Eberthella typhosa*. In the enforcement of the Federal Insecticide Act it is required that phenolic type disinfectants be used at dilutions equivalent in germicidal value against *E. typhosa* to a 5 per cent solution of phenol, i.e., at 20 times their phenol coefficient values. Thus a disinfectant with a phenol coefficient of 5.0 should be used for general purposes at a dilution no weaker than 1 per cent. This regulation is for the purpose of allowing a reasonable margin of safety so resistant and inaccessible organisms will be killed in general practice.

Wright⁶ has shown that different brands of peptones used in the composition of the culture medium will give somewhat different coefficient values. The Food and Drug Administration⁵ method prescribes that the culture medium be made with Armour's peptone

prepared specially for disinfectant testing purposes. This method has become generally relied upon as a means of determining phenol coefficients; and it has been shown that by this method workers in widely separated laboratories can obtain essentially the same phenol coefficient value on different samples of the same preparation.²

In 1940 Petroff and Schain⁴ published data showing that the bactericidal properties of germicides are enhanced with the addition of detergents. Within recent years it has become a very common practice to add relatively small amounts of wetting agents to disinfectants with a resulting increase in their phenol coefficients.

It now has been brought out that the phenol coefficient determination alone may not be an adequate laboratory measure of the germicidal value of disinfectants containing wetting agents. During the past year a group of four disinfectants from different manufacturers were tested in the laboratories of the Agricultural Marketing Administration for another governmental agency. Their phenol coefficients were found to be far above the minimum coefficient specified and well above their professed coefficient values.

When the coefficients of these samples were rechecked by using the organisms from two test cultures—I and II—

^{*} Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

the results differed from each other. Test culture I gave the results previously obtained while test culture II gave lower coefficients. Both I and II were 24 hour cultures in F.D.A. media inoculated from the same source, the only difference in the media being that the peptone ingredient of culture medium II bore a different lot number, having been purchased about a year earlier than that used for making medium I. The difference between coefficients determined with test culture I and II are as follows:

TABLE 1

| Disinfectant | Phenol Coefficients | |
|--------------|---------------------|----------------------|
| | F.D.A. Culture I | F.D.A. Culture II |
| A | 9.5 | 5.0 |
| B | 15.0 | 4.4 |
| C | 17.0 | 5.5 |
| D | 30.0 | 14.4 |

Culture I and culture II are the same except that the peptone used in making the media bore different lot numbers.

Repeated tests showed that the two test cultures possessed the same resistance to phenol. Against alcohol test culture II showed a slightly lower resistance. No difference in the microscopic appearance of the organisms could be observed. The plate count was approximately equal when salt solution was used to make serial dilutions but test organism I showed a greatly reduced count compared with organism II when serial dilutions were made with water.

Disinfectant B was subjected to further study. When six other strains* of *E. typhosa* were cultured in medium I and medium II and used as test organisms against disinfectant B, the respective divergence of phenol coefficients were comparable to those obtained with the Hopkins strain initially used.

It was thought probable that this group of disinfectants contained wetting

agents which were responsible for the peculiar variation in their phenol coefficients. Consequently two synthetic detergents* (Tergitol, Carbide and Carbon Chemical Corporation, and Vatsol, American Cyanamide and Chemical Corporation) were added in 0.1 per cent amounts to the phenol dilutions tested against test cultures I and II. In the presence of both of these wetting agents the test organism from culture medium I was killed by the higher dilution of phenol. With 0.1 per cent Tergitol present, a 1-125 dilution of phenol killed test organism I in 10 minutes while a 1-100 dilution was required to kill test organism II; 0.1 per cent Vatsol decreased the concentration required to kill *E. typhosa* from 1-90 to 1-160 in the case of the former test culture and to 1-140 in the latter. In the concentrations used neither of these detergents was germicidal for *E. typhosa*. It appeared very definite therefore that some compound of the nature of synthetic detergents was an ingredient of the disinfectants and responsible for the difference in their germicidal action against the two test cultures.

When washed organisms from test culture I were suspended in sterile medium II the same coefficient value was obtained as when washed organisms from culture II were suspended in medium I. Against these resuspended organisms disinfectant B showed a phenol coefficient of 6.6 compared with 15.0 for culture I and 4.4 for culture II. From this it would appear that the peptone in culture medium II contained some ingredient not contained in the peptone of culture medium I which counteracted the enhancing properties of wetting agents; and imparted this quality to the typhoid organisms cultured in it.

* Kindly supplied by Dr. F. W. Tilly, Bureau of Animal Industry, U. S. Department of Agriculture.

* Obtained through the kindness of Dr. H. L. Cupples, Division of Insecticide Investigations, Bureau of Entomology, and Plant Quarantine, U. S. Department of Agriculture.

Baker and coworkers¹ found that phospholipids from various sources inhibited the action of synthetic detergents. Consequently the phenol coefficient of disinfectant B was determined with test culture I in the presence of soluble lecithin as well as Brain Liver Heart Medium (Difco). Added on the basis of 0.1 per cent brain (0.25 per cent complete medium) this preparation reduced the phenol coefficient of disinfectant B to 5.5 while 0.1 per cent lecithin reduced the coefficient to 6.6 and 0.2 per cent lecithin brought the coefficient to 4.0. With either of these sources of phospholipid added to phenol enhanced with wetting agent, the concentration of phenol required to kill test culture I was increased to the concentration required to kill test culture II.

Test cultures I cultured in medium I to which had been added 0.1 per cent lecithin or 0.25 per cent Brain Liver Heart Medium (Difco) reduced the coefficients of all four of the disinfectants below the coefficients obtained with test cultures from the unaltered medium. The results are shown in Table 2; results with test culture II are added for comparison.

TABLE 2

Phenol Coefficient

| Disinfectant | Test Culture I | Test Culture 1-A | Test Culture 1-B | Test Culture II |
|--------------|----------------|------------------|------------------|-----------------|
| A | 9.5 | 5.0 | 4.0 | 5.0 |
| B | 15.0 | 4.0 | 7.0 | 4.4 |
| C | 17.0 | 6.5 | 7.0 | 5.5 |
| D | 30.0 | 11.0 | 16.0 | 14.4 |

Test culture 1-A is F.D.A. medium culture I plus 0.1 per cent lecithin

Test culture 1-B is F.D.A. medium culture I plus 0.25 per cent Brain Medium (Difco)

NOTE: By using the current lot of prescribed peptone the following phenol coefficients were obtained: A 6.0, B 6.0, C 9.0, D 19.5.

The results of this investigation definitely indicate that one lot of the prescribed peptone for F.D.A. medium contained phospholipid substances lacking in another lot. These phospholipids

are extremely important in the determination of phenol coefficients.

DISCUSSION

Consideration of this report leads to the conclusion that phenol coefficient statements on certain disinfectants containing synthetic detergents are of little or no value. With a determined phenol coefficient of 15.0 for disinfectant B, it might properly be considered a safe general germicide when diluted with 300 parts of water. It was found, however, that a 1-150 dilution of this product failed to kill *Escherichia coli* in 5 minutes and a 1 per cent solution failed to kill pyocyanous (*Pseudomonas aeruginosa*) in 10 minutes. Incidentally a 10 per cent solution of this preparation also failed to kill *Staphylococcus aureus* in 10 minutes. Used according to customary standards, such a product may be valueless as a disinfectant or it may be an effective germicide, depending upon the composition of the peptone used in culturing the phenol coefficient test organism.

The use of peptone with known phospholipid content may become important in the germicidal testing of disinfectants containing wetting agents. However, not all phospholipid substances appear to affect different synthetic detergents alike; and there are many such detergents now available. Cupples³ in 1940 listed over 300 individual preparations of this nature. In connection with the above investigation it was found that added Brain Heart Medium (Difco) was slightly more effective than 0.1 lecithin in lowering the phenol coefficient of disinfectant B when using test culture I; this was contrary to the effect when these enrichment substances were used in the culture medium (see Table 2). Both were approximately equal in reducing the effect of the two detergents added to phenol. But lecithin was much more active than the Brain Heart Medium when added to Zephiran, a surface-

acting compound with high germicidal activity. Zephiran diluted 1-30,000 killed test culture I, and diluted 1-20,000 killed test culture II; 0.25 per cent Brain Heart Medium also reduced its germicidal dilution against test culture I to 1-20,000; but 0.1 per cent lecithin prevented a 1-2,000 solution from killing test culture I in 5 minutes.

The problem of finding a laboratory method for testing the germicidal properties of disinfectants containing synthetic detergents, just as reliable as the phenol coefficient method is for basic coal tar disinfectants, does not appear to be easy of solution.

SUMMARY

Data presented show that the peptone component of the medium for culturing phenol coefficient test organisms may seriously affect the phenol coefficient obtained. This effect on the test culture

is not detectable from the results of the phenol control.

It can be deduced from this investigation that when tested against *E. typhosa* the germicidal activity of disinfectants containing synthetic detergents is greatly altered by the phospholipid content of the culture medium.

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Comparative Nutritive Value of Butter Fat and Vegetable Oils*

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SOME 25 years ago¹ it was shown that milk fats were superior to vegetable oils because they contained vitamin A, which was not contained in the vegetable oils. Because of this fact legislation was enacted in various states prohibiting the removal of fat from milk and replacing it with a vegetable oil. In other words, the manufacture of "filled milk" was prohibited by statute in many states, and also by the federal government. Within the last few years those who would like to make a filled milk have learned how they can add vitamins A and D to these vegetable oils and then claim a nutritive value of the product equal to that of milk. By getting out an injunction against the enforcement of the filled milk legislation and prohibiting the enforcement of the law, these companies have succeeded in distributing very considerable quantities of "filled milk." In some states decisions in reference to the validity of the filled milk legislation are pending. In other states licenses are given allowing the manufacture of filled milk, but with an imposed tax.

Now, what is the situation in reference to the nutritive value of butter fat as compared with the vegetable oils? When a vegetable oil fortified with

vitamins A, D, and E is homogenized into skimmed milk to a 4 per cent level and the skimmed milk reinforced with iron, copper, and manganese, there is always an inferior growth of young weanling rats as compared with rats receiving butter fat.² Not only do the rats on butter fat grow better, but they look better; and when kept for reproduction studies, marked superiority in numbers born and reared results.

This growth stimulating property of butter fat lies in the saponifiable fraction,³ since feeding the non-saponifiable fraction with corn oil or coconut oil did not give the results obtained with the butter fat. This superiority of butter fat is not due to a phosphatide or any constituent of a phosphatide, such as choline or choline.⁴ It seems to be due to a saturated acid (or acids) of high molecular weight which is not present, at least in quantity, in the vegetable oils investigated. Hydrogenation of the unsaturated fraction of butter fat results in a product which when added to corn oil gives a growth response superior to the butter fat itself. Hydrogenation of the vegetable oils, such as corn oil, cottonseed oil, soy bean oil, and coconut oil, did not improve their growth promoting properties.⁵

These results make us believe that, in addition to its vitamin A content, butter fat is constitutionally superior to the vegetable oils investigated. This

* Presented before the Food and Nutrition Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

applies particularly in the nutrition of young rats. Similar experiments, however, and similar results with calves have been secured at the University of Minnesota.⁶ Possibly all animal fats are superior for the nutrition of the young to the vegetable oils because of their content of certain essential fatty acids. I do not here refer to the unsaturated acids like linolenic, which prevents what is known as the Burr's disease. These results for the first time show that constitutionally butter fat is superior in the nutrition of a young animal, like a rat, to the vegetable oils investigated. They also make it clear that reinforcement of a vegetable oil with vitamins A, D, and E, will not make it equal in nutritive value to butter fat for the young. These results also make it clear that "filled milk" as at present made, should not be allowed to get into the channels of infant and child nutrition. It may be a healthful food but it shows some deficiencies, just as do many of our staple foods; but where a food becomes the *sole* nutrient of the young, such as whole milk does, then the commercial distribution of an inferior substitute should be prevented.

SUMMARY

Experiments with young rats indicate the superiority for growth of butter fat as compared with certain vegetable oils. This superiority rests upon a constitutional difference and is not related to the differences in vitamin content.

As the sole article of nutrition a "filled milk" in which a vegetable oil has been substituted for the butter fat, based on rat experiments, could give inferior growth with the infant; but no such experiments have been carried out. Until they have and an equality is established, if it exists, the burden of proof of equal value must rest with the purveyor of filled milk, and the public should be protected from a substitute for natural milk.

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THE BEVERIDGE REPORT: A SPRINGBOARD FOR THIS EDITORIAL

THAT document which has come to be known as the Beveridge Report (Social Insurance and Allied Services in Great Britain) is now attracting considerable attention and doubtless will continue to interest economists, governments, social agencies, and the medical profession in this hemisphere. In due time, the Report will be reviewed in the JOURNAL. For the moment, it may be said that it sets forth a carefully considered plan, proposed for social security of the people of Great Britain. According to the author, "... the aim of the Plan for Social Security is to make want under any circumstances unnecessary." In relation to medical service, this is said: "Medical treatment covering all requirements will be provided for all citizens by a national health service organized under the health departments and post-medical rehabilitation treatment will be provided for all persons capable of profiting by it." These are bold and forthright statements, clear-cut in their simplicity. They leave no room for confusion as to objective.

The wisdom and applicability of this plan, in its relation to Great Britain, is obviously a matter for Great Britain and only Great Britain to decide. For one in another nation to voice a vote yea or nay would be presumptuous. But in relation to the United States, this Beveridge Report is of particular interest at the moment, for recent news items indicate that the federal government will undertake to provide for the United States a social security plan more inclusive than that which now exists. Inevitably, then, pending announcement of this plan for the United States, and even after that, the Beveridge Report will be scrutinized in terms of its adaptability to the situation in this country. The nature of scrutiny of this document, and of the plan for the United States, will not in all cases be objective and dispassionate. On the contrary, predilections, prejudices, opinions, affiliations, and other conditioning factors will cause many to view all such plans with a jaundiced and tory-like eye; and similar factors will influence about an equal number, out-of-hand, to regard any social security plan as a cross between

the Bill of Rights and the Emancipation Proclamation. Thus there will be those who believe that the bedrock of a successful civilization must rest completely and only upon the full exercise of personal initiative and responsibility and devil take the hindmost, and those who believe that the successful person is, at a minimum, three-fourths rogue, and that the mere fact that a man is down and out is *prima facie* evidence that he is a fine fellow who has been unjustly dealt with.

With these conflicting thoughts, opinions, and interests, it will, of course, be difficult to discover the ideal arrangement, either within the broad field of sociology or in the narrower one of medical care. While it is not probable that the true answer is to be found in an exact middle ground, it is equally unlikely that the solution lies in either one of the extremes. Somewhere in between, to the right or to the left of the center, is the course of wisdom. This wise course is not likely to be reached through an approach giving emphasis to the "rights" of those who have had neither the intelligence nor the integrity to take care of themselves, nor will it include a philosophy that those who have shown initiative and thrift owe something to those who have wasted their opportunities. It will, however, recognize that even in as wealthy a country as this, no inconsiderable proportion of the population is made up of fine American citizens who have been unable to get beyond a bleak subsistence level; that, though possessing initiative and in no way inclined to lean upon others, many millions under the pressure of living have not succeeded in accumulating savings or investments and who, though they have worked faithfully and intelligently within their respective spheres, are not in position to meet the catastrophes of sickness and unemployment. Here the situation exists not because of personal ineptitude or stupidity or slothfulness but rather because of the complexities of a social order to which people of this sort contribute substantially, but from which they receive but meager returns. If there is any logic or strength, or the seeds of permanency in that civilization which created these complexities, it is in all decency obligated to take such measures as may be necessary to offset want and injustice. Families of the sort mentioned, caught in the economic maelstrom, do have rights, and are entitled to social security.

As regards medical service, it seems sensible to conclude that, complementary to private practice, there is need of providing some pooling of resources which will assure good professional care to those who cannot otherwise obtain it. We are not sufficiently an economist to know whether the medical service should be supported by an over-all tax or on an insurance basis. We are inclined to think the latter, but probably hold that opinion because of a desire to avoid being taxed for a service we should not expect to use. If medical care is to be on an insurance basis, it would be necessary, probably, to make such insurance compulsory for those who benefit by unemployment allowances or similar security provisions. Perhaps it should be optional for others. It would be essential, too, so to organize and administer the medical service that it would function on as high a level, and professionally as independently, as a hospital staff. In these opinions we undoubtedly reflect our own predilections, affiliations, and conditioning factors, but we are not naïve enough to think that the matter is as simple as set forth above, nor so inexperienced as to believe that any plan adopted would be free of undesirable elements, deficiencies, and pitfalls. In any event, we believe that if a wise course is to be charted, it is about time that the sane majority of

physicians and the public make themselves heard. This is not a situation which can be benefited either by a blind defense of the status quo or by advocating change for change's sake.

THE ATYPICAL PNEUMONIAS

MORE and more, in medical and public health journals, there are appearing reports of a respiratory infection, or infections, which presents unusual characteristics and unexpected pathology. At present the situation is not clear, but in substance it is this: Clinicians have discovered that many individuals who appear to have only a moderately severe acute upper respiratory infection, prove on x-ray to have a pneumonia. Naturally the severity of illness varies from case to case, but there is general agreement that the results of physical examination are not an index of the underlying pathology; that the patient seems sicker than physical examination of the chest would lead one to expect; that bacteriological investigation does not yield significant findings; that the ordinary chemotherapy of pneumonia is ineffective.

There is no agreement as to how the disease, or diseases, should be designated. Part of this confusion is incident to limitation of knowledge, part of it reflects differences in approach. From a clinical standpoint, the patient presents an unusual condition, and there have thus arisen such terms as "Atypical Pneumonia," "Atypical Pneumonia of Reimann," "Atypical Bronchial Pneumonia," "Atypical Pneumonia with Leukopenia," "Grippe," "Current Bronchial Pneumonia of Unusual Character and Undetermined Etiology," and "Primary Atypical Pneumonia, Etiology Unknown." The last two terms obviously are giving consideration not only to the clinical aspects, but to the etiological. Also from the etiological standpoint other designations are used; "Virus Pneumonia," "Type A Virus Pneumonia," "Acute Infection of the Respiratory Tract, Type A," "Acute Influenza Pneumonitis," "Acute Influenzal Pneumonia." Then on the basis of x-ray findings and underlying pathology, there arise the terms "Pneumonitis," "Acute Pneumonitis," "Acute Interstitial Pneumonitis," "Disseminated Focal Pneumonia," "Benign Circumscribed Pneumonia."

In spite of so many different descriptive titles, there is a tendency to believe that one etiological agent is responsible, probably a virus. As against this hypothesis is the situation in regard to influenza in which there was thought to be a single causative organism, but where further research indicates that at least three distinct etiological agents are involved. Specifically, in connection with causative agents, there has come from the National Institute of Health the report that in a small outbreak of pneumonitis in a group of laboratory workers there was recovered a rickettsia which exhibited the characteristics of a rickettsia previously isolated from cases of "Q" fever. Some time ago, too, the Research Laboratory of the California Department of Public Health reported the isolation of a psittacosis-like virus from two persons who had died of atypical pneumonia; and a more recent paper from the same source indicates that an identical virus was recovered from two cases of atypical pneumonia arising from laboratory infection. A report from another source suggests an association between this

type of pneumonia and a virus which causes pneumonia in cats. Research has been carried out by others, and investigations continue.

Epidemiologic study of so-called virus pneumonia has not progressed as far as is desirable. A deterrent to further advance along this line is the fact that the condition frequently remains undiscovered. In many instances no physician is called or, if called, he may fail to make a correct diagnosis, a failure likely to occur in the absence of x-ray examination of the chest. Finally, it is seldom that even those cases diagnosed come to the attention of the epidemiologist, for few health departments require the reporting of atypical pneumonia as such. The New York City Board of Health has recently made the condition reportable, as doubtless has been done in one or two other forward-looking places. In spite of the lack of knowledge as to causative agent or agents, reporting regulations would seem to be one additional means by which further information may be obtained. It might be well for health officers to give thought to regulations of this sort.

THE YEAR BOOK

This issue of the JOURNAL, for several years, has been supplemented by the *A.P.H.A. Year Book*. Initiated in 1931, and continued in successive years, the twelfth volume, that for 1941-42, will probably be the last for the duration.

The Executive Board has decided to suspend publication of the *Year Book* as an economy measure and as a means of meeting the Government's request to publishers for a 10 per cent reduction in the use of paper.

The JOURNAL will carry from month to month the essential material that has been concentrated in the *Year Book*. A list of Association and Section Committees with their personnel is published in this issue. Next month the Reports of Association Committees presented at the St. Louis Annual Meeting will appear. In May, Committee Reports of one of the Sections will be published as a unit, in June of another Section, and so on until all have been made available. The Committee Reports will occupy the same place in the JOURNAL each month, immediately following the editorials.

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Scarlet Fever

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Bacterial Food Poisoning—Gail M. Dack, M.D., University of Chicago, Chicago, Ill.

Blood Cultures—Casper G. Burn, M.D., Long Island College of Medicine, Brooklyn, N. Y.

Gonorrhea and the Gonococcus—Charles M. Carpenter, M.D., University of Rochester, Rochester, N. Y.

Helminth Parasites and Intestinal Protozoa—Harold W. Brown, M.D., University of North Carolina, Chapel Hill, N. C.

Infectious Mononucleosis—Charles A. Stuart, Ph.D., Brown University, Providence, R. I.

Laboratory Diagnosis of Diphtheria—Martin Frobisher, Jr., D.Sc., Johns Hopkins University, Baltimore, Md.

Laboratory Diagnosis of Rabies—Thomas F. Sellers, M.D., State Board of Health, Atlanta, Ga.

Laboratory Methods for the Diagnosis of Fungus Diseases—William D. Stovall,

M.D., State Laboratory of Hygiene, Madison, Wis.

Lymphogranuloma, Granuloma Venerium, Chancroid—Everett S. Sanderson, M.D., University of Georgia, Augusta, Ga.

Malaria—Aimee Wilcox, National Institute of Health, Memphis, Tenn.

Meningitis and Meningococcus—Sara E. Branham, M.D., National Institute of Health, Bethesda, Md.

Recognition and Significance of Hemolytic Streptococci in Infectious Diseases—Julia M. Coffey, State Department of Health, Albany, N. Y.

Serological and Bacteriological Procedures in the Diagnosis of Enteric Fevers—Marion B. Coleman, State Department of Health, Albany, N. Y.

Serological, Bacteriological and Other Biological Procedures in the Diagnosis of Undulant Fever—A. Parker Hitchens, M.D., University of Pennsylvania, Philadelphia, Pa.

Serological Tests for the Diagnosis of Syphilis—Ruth Gilbert, M.D., State Department of Health, Albany, N. Y.

Studies on the Toxicity of Dyes for Bacteria—Edmund K. Kline, Dr.P.H., Cattaraugus County Department of Health, Olean, N. Y.

The Pneumococcus—Wheelan D. Sutliff, M.D., Department of Health Laboratories, New York, N. Y.

Trichinosis—Lucy Heathman, M.D., State Department of Health, Minneapolis, Minn.

Tuberculosis and the Tubercle Bacillus—A. L. MacNabb, D.V.M., Department of Health, Toronto, Ont.

Tularemia—George D. Brigham, Ph.D., Rocky Mt. Laboratory, Hamilton, Mont.

Typhus Fever and Laboratory Methods for Its Recognition—Henry Welch, Ph.D., Food and Drug Administration, Washington, D. C.

Whooping Cough and B. Pertussis—Pearl L. Kendrick, Sc.D., Department of Health Laboratories, Grand Rapids, Mich.

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Laboratory Diagnosis of Rabies—Harry Carnes, M.D., State Department of Health, Atlanta, Ga.

Laboratory Methods for the Diagnosis of Fungus Diseases—Lois Almon, Ph.D., State Laboratory of Hygiene, Madison, Wis.

Studies on the Toxicity of Dyes for Bacteria—Cassandra Ritter, Water Laboratory, University of Kansas, Lawrence, Kans.

Tuberculosis and Tubercle Bacillus—M. H. Brown, M.D., University of Toronto, Toronto, Ont.

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Chemical Methods of Sewage—F. Wellington Gilcreas, State Department of Health, Albany, N. Y.

Coliform Group Variants—Leland W. Parr, Ph.D., George Washington University, Washington, D. C.

Methods for the Determination of Iodine—John T. Tripp, Ph.D., State Department of Health, Lansing, Mich.

Microscopic Methods of Water—Theodore A. Olson, 3010 Redick, Omaha, Neb.

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*Referee*¹ for:

Chemical Methods of Examining Dairy Products—W. A. Queen, Food and Drug Administration, Washington, D. C.

Comparative Tests of Agar Media for Standard Milk Work—S. R. Damon, Ph.D., State Board of Health, Montgomery, Ala.

Coördination of Milk Ordinance and Laboratory Work—A. W. Fuchs, C.E., 5420 Connecticut Avenue, Washington, D. C.

Laboratory Equipment—Raymond V. Stone, D.V.M., 808 North Spring Street, Los Angeles, Calif.

Methods for Detecting Organisms of the Coliform Group—A. J. Slack, M.D., Institute of Public Health, London, Ont.

¹ Referees are members of the Standard Methods Committee upon which they serve.

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Methods of Counting Bacteria in Dairy Products—A. H. Robertson, Ph.D., State Department of Agriculture and Markets, Albany, N. Y.

Methods of Isolating Specific Types of Bacteria in Dairy Products—Mac H. McCrady, 89 Notre Dame East, Montreal, Que.

Methylene Blue Reduction Test—C. A. Abele, Ch.E., State Board of Health, Chicago, Ill.

Microbiological Methods for Examining Butter—Harold C. Olson, Ph.D., Oklahoma Agricultural and Mechanical College, Stillwater, Okla.

Sediment Test—E. H. Parfitt, Ph.D., 307 North Michigan Avenue, Chicago, Ill.

Tests for the Sterility of Dairy Utensils—Walter D. Tiedeman, M.C.E., State Department of Health, Albany, N. Y.

Associate Referee² for:

Methods for the Examination of Cheese—M. W. Yale, Ph.D., New York State Agricultural Experiment Station, Geneva, N. Y.

Methods of Examining Milk for Evidences of Brucella Infection—I. F. Huddleson, Ph.D., Michigan State College, East Lansing, Mich.

Methods of Examining Milk for Tubercle Bacilli—William A. Hagan, D.V.M., State Veterinary College, Cornell University, Ithaca, N. Y.

Methods of Identifying Streptococci in Dairy Products—George J. Hucker, Ph.D., New York State Agricultural Experiment Station, Geneva, N. Y.

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Microbiological Examination of Ingredients—F. W. Fabian, Ph.D., Michigan State College, East Lansing, Mich.

Sediment Testing of Frozen Desserts and Ingredients—Milton E. Parker, 1526 S. State Street, Chicago, Ill.

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Chemical Determinations of Modified Babcock Methods for Frozen Desserts—W. H. Martin, Kansas State College, Manhattan, Kans.

Chemical Determinations for Phosphatase Test for Frozen Desserts—George Jaggard, 1037 Park Avenue, Collingswood, N. J.

Chemical Determinations of Stabilizers in Frozen Desserts—F. Leslie Hart, Food and Drug Administration, San Francisco, Calif.

Determination of Overrun in Ice Cream—P. S. Lucas, Michigan State College, East Lansing, Mich.

Microbiological Examination of Condensed and Evaporated Milk—Paul A. Downs, Ph.D., University of Nebraska, Lincoln, Nebr.

Microbiological Examination of Dry Milk—Paul S. Prickett, Ph.D., Evansville, Ind.

Microbiological Examination of Eggs—M. Thomas Bartram, Ph.D., Food and Drug Administration, Washington, D. C.

Microbiological Examination of Flavors, Colors, Fruits and Nuts—M. J. Prucha, Ph.D., University of Illinois, Urbana, Ill.

Microbiological Examination of Sugar—H. H. Hall, U. S. Department of Agriculture, Washington, D. C.

Sampling for Chemical Determinations—P. H. Tracy, Ph.D., University of Illinois, Urbana, Ill.

Sediment Testing of Concentrated and Dried Milks—E. C. Thompson, Ph.D., 350 Madison Avenue, New York, N. Y.

Sediment Testing of Egg Products—Bernard E. Proctor, Ph.D., Massachusetts Institute of Technology, Cambridge, Mass.

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Chemical Disinfectants — Charles M. Brewer, U. S. Department of Agriculture, Beltsville, Md.

Detergents—Walter L. Mallmann, Ph.D., Michigan State College, East Lansing, Mich.

² Associate Referees are not members of the Standard Methods Committee upon which they serve.

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Disinfection of Air by Germicidal Vapors
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Disinfection of Air by Ultraviolet Irradia-
tion — Alexander Hollaender, Ph.D.,

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Fungicidal and Fungistatic Agents—C. W.
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American Hospital Association (liaison representative)
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American Society of Civil Engineers and Federation of Sewage Works Associations—Joint Committee for Revision of the Report on Definition of Terms Used in Sewerage and Sewage Disposal Practice
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BOOKS AND REPORTS

Trichinosis Problem in California
—*Report of a Survey, 1940-1941*—K. B. Kerr, Sc.D., *State of California Department of Public Health in Cooperation with the U. S. Public Health Service*, 1942. 37 pp.

This pamphlet presents information on the sources of hogs slaughtered in California, the incidence of trichinosis in these hogs, the character of the food which was fed to them, the type of trichinous pork products and their degree of infection, percentage of cases of human trichinosis, and the reported sources of infection of human cases in California. As in surveys previously made in other states, this survey demonstrates the high incidence of trichinosis in garbage-fed hogs (6.4 per cent or 50 per cent of all trichinous pork sold in California). Fresh sausage was the most usual pork product infected, but one sampling of pork chops was found with live trichinae. Cooking of garbage from municipalities before feeding to swine is recommended as a corrective. The report is documented with eleven tables, two maps, and one chart, and has nineteen bibliographic references.

ERNEST CARROLL FAUST

Rockefeller Foundation, International Health Division—Annual Report, 1941—*New York (49 West 49th Street)*, 1942. 224 pp.

To a large extent this report of the International Health Division is a well considered review of the prospects which the future holds for public health. It should be informative to workers in our field to learn where the areas of great potential discovery seem to lie. These reports of studies in yellow fever, influenza, rabies, virus studies, typhus fever, malaria, syphilis, tuber-

culosis, diphtheria, mental hygiene, and nutrition show something of the breadth of the field and indicate where there is hope for more light. Once again the report represents more than an account of stewardship. It is a source of factual information rivalling in its range any other abstracts of research conducted around the world. Presented here in succinct form, it is well worth the thoughtful reading of everyone who wishes to be abreast of the developing science of hygiene.

Of the total of \$72,565,000 spent by the Foundation for public health since 1913, \$18,519,000 has been spent for the control and investigation of specific diseases and deficiencies; \$6,782,000 for aiding state and local health services; and \$6,469,000 for the education of health workers. Buildings, equipment and endowment given for public health represent more than \$22,000,000. Never before in the history of the world has there been such an outpouring of generous help and good will. To a large extent this organization has set the pattern for the more liberal grants now being made by governments in many countries. Without such preparation as this during the last 30 years it would be impossible now to find the human resources to operate the present expanded programs. The public health professions are deeply in debt to the Rockefeller Foundation. REGINALD M. ATWATER

Heredity, Food, and Environment in the Nutrition of Infants and Children—*By George Dow Scott. Boston: Chapman and Grimes*, 1942. 778 pp. Price, \$5.00.

Another "nutrition" book has been written. The first three hundred-odd pages discuss in a reminiscent and

rambling way such matters as heredity, mating, cells, disease, and diagnosis, among other topics. The sections on genetics have been quite ably scoffed at by another reviewer (*J. Heredity*, Sept., 1942). When Dr. Scott finally gets around to his subject the reader, if he has read that far, can only guess what will come next.

Among examples of what might be called "rambling" are such statements as this one (from p. 321, *Pertinent Facts in Infant Feeding*): "Could science in the *past* have controlled *preceding* generations by modern medical methods, fewer dysfunctions from parental syphilis and from other toxins might have been transmitted, fewer alcoholic or sexual excesses might have occurred to darken the lives of so many succeeding little innocent children." (*Italics ours.*) Or take this one (from p. 323): "Food, plant, and metal poisons in *lethal doses may counteract* beneficial tendencies (to cure of nutritional diseases)." (*Italics ours!*) By now the reader will have concluded that the author is a master of the qualified statement.

In the remaining 450 pages, 130 are devoted to what is called "Physical and Psychic Stimuli," including such matters as massage, hydrotherapy, baths, sex attraction, and clothing, four kinds of climate, and music, to name only a few of the diverting topics.

In the chapter headed, "Fruits" there is a 17 page cookbook including a recipe for fish in jelly and one for snert (pig's feet).

The book has no index, but only a table of contents. A bibliography occurs after each chapter and is not alphabetized. CARROLL E. PALMER

First Aid. Surgical and Medical
—By Warren H. Cole, Charles B. Puestow and 17 other medical authorities. New York: Appleton-Century, 1942. 374 pp. Price, \$3.00.

Drs. Cole and Puestow have collaborated with several of their colleagues on the University of Illinois College of Medicine Faculty to produce this very useful book on a timely topic. First Aid, it appears, is the most currently popular subject in the field of health education—more than 4½ million people have taken the standard Red Cross course in the last three years!

The book is primarily directed toward the person with a background of knowledge in the biological sciences, especially medicine. The treatment of topics is sufficiently versatile so that physicians, medical students, and nurses will find it of interest and practical value. Many non-medical public health workers can likewise study it with profit.

The greater part of the text is devoted to emergencies relating to accidents caused by war, although emergencies encountered in peacetime have not been neglected. Coverage of such topics as the emergency treatment of wounds, burns, hemorrhage, and shock is especially clear and to the point. A description of blast shock, a potential civilian hazard in World War II, will bring this subject to the attention of many readers for the first time. Definitive or long-range care is touched upon in discussions of first aid treatment, thus lending further interest to the individual subjects. The use of the sulfonamides is alluded to frequently.

The illustrations, which were produced under the auspices of the medical school's Illustration Studio, are decidedly helpful.

The authors feel that first aid training should be part of the individual's liberal education, a principle with which all health workers will agree.

The book can be heartily recommended to all public health workers regardless of whether they are trained in the medical sciences or not.

MILTON ROSE

Aftereffects of Brain Injuries in War, Their Evaluation and Treatment, the Application of Psychologic Methods in the Clinic—By Kurt Goldstein. Foreword by D. Denny-Brown. New York: Grune and Stratton, 1942. 224 pp. Price, \$4.00.

During the World War of 1914–1918 a number of hospitals for the study and care of cerebral injuries were set up in Germany. Kurt Goldstein had charge of one of these institutions. As a result of his experiences he realized the necessity for certain technics of examination and methods of training in rehabilitation, which were previously unknown in the clinic. Fortunately, associated with him was an experimental psychologist, A. Gelb, well trained in psychological methods, with whom technics for functional analysis of behavior were developed. Although Goldstein has described these procedures in some detail in German periodicals, they have not been widely read by clinicians to whom they should have a special appeal at the present time.

The book is divided into two sections, the first dealing with symptomatology and the second treatment. In the first part the author presents a sketchy review of the neurological signs and symptoms following head injuries. The mental aberrations are then discussed in greater detail and the methods which may be used to bring out the defects in the higher mental functions are described. This portion of the book is of particular value to the student of the nervous system, who so often is unacquainted with the tools by which mental impairment may be measured and who using malapropos tests concludes erroneously, that the higher mental functions are intact.

In the second half of the book the treatment of these cases is discussed. Although the therapy is presented clearly and based upon sound psychological principles, the individual meth-

ods of training are largely outmoded due to the rapid advances in the past decade of radio electronics and cinematography. The concluding chapter discusses the problem of social adjustment, which from the patient's standpoint is of paramount importance. Goldstein's statistics on the rehabilitation of patients suffering from cerebral lesions is interesting. Twenty per cent became practically normal workers, 62 per cent were able to do some type of work but below normal capacity, and 18 per cent were unable to pursue any type of painful occupation.

The book is a clear presentation of the problem of the care and rehabilitation of the cerebrally injured, which should be of interest to psychologists, neurologists, neurosurgeons, psychiatrists, and clinicians in general. The bibliography is a valuable although incomplete list of the publications on this subject with particular emphasis on the German literature.

A. EARL WALKER

Ambassadors in White — By Charles Morrow Wilson. New York: Henry Holt, 1942. 372 pp. Price, \$3.50.

This is a book for the man in the street who seeks a general impression, a vivid suggestion of the facts without particular concern about the accuracy or refinement of details. It is a journalist's contribution to the new national interest in the 120 millions or so of neighbors below the Rio Grande.

Of the fourteen chapters, half are devoted to a wholly laudable hero-worship of men of various nativities, but all medical disciples, and each worthy of all praise for his practical services to Latin America.

The first two chapters, "Sick Man's Society" and "Past and Present," may well be required tourist reading for post-war sea-going travellers. Our own Puerto Rico should have taught us

continentals of the States the meaning of centuries of neglect by incompetent governments, essential poverty developed by absentee landlordism, and pervading ignorance without the relief of even the most elementary schooling until recently.

Disease in mass is well illustrated by word, by story, by statistics. The answers to the prayer for prevention are known and can be made effective when commerce, government, and the church combine to provide the men of science with the support needed.

Such a title as "Fierce, Deep, Black Mysteries" is heavily charged only for the quite uninformed physician or nurse or health officer of today, being a series of sketches of diseases fortunately not common in temperate zones.

"Damn the Mosquitoes" and "Banana Medicine" are catchy headings and appeal to the reader who has a bit of spare time to refresh his memory of insect and other pests.

A breezy, well illustrated book which, it is hoped, will carry conviction to the reader who sticks too close at home, or makes travelogues his hobby and wants to know more about Central and South America right now.

HAVEN EMERSON

Contraception and Fertility in the Southern Appalachians—*By Gilbert W. Beebe. Baltimore: Williams & Wilkins, 1942. 274 pp. Price, \$2.50.*

The most recent definitive analysis of the effect of contraception on group fertility is Mr. Beebe's study of a service established in Logan County, West Virginia in 1936. This service, unlike those designed to serve women who need contraceptive advice for medical reasons, was a frank attempt to reduce fertility in a region of excessive population pressure.

Contraceptive jelly was distributed to women desiring to try it by a public health nurse who made home visits in

coal mining camps. The first patients were referred by physicians in the county, who gave the project their whole-hearted approval. Other women, who heard of the service, were glad to avail themselves of it, and at the end of three years about 1,300 women had been enlisted.

Mr. Beebe's book begins with a discussion of the economic and social characteristics of the people in the area and an analysis of their fertility before the service was established. His study of the selective factors operating among women accepting advice constitutes a new and very valuable contribution to the field of study. The collection of data on a random sample of women who refused the service, as well as of those who accepted it, substantiates the long existing "hunch" that women who seek or accept contraception are mainly those who have been unable to control their fertility satisfactorily.

On the basis of this information, Mr. Beebe has been able to measure not only the impact of the service on the fertility of the women accepting contraceptive advice, but also to estimate the total reduction in county fertility achieved by this type of service.

Mr. Beebe is convinced that rural services such as the one studied should be instituted under the supervision of official public health agencies. The final chapter discusses the problems of organization and costs in detail, and should be of special interest to public health administrators.

REGINE K. STIX

Civilian Health in Wartime—*By Francis R. Dienaide, M.D. Cambridge: Harvard University Press, 1942. 328 pp. Price, \$2.50.*

Interesting and informative, this book will be thoroughly enjoyed by professional workers and laymen alike. Public health in its broad aspects is surveyed

and the whole related to present-day health organization. Recently established governmental agencies are noted in relation to the fields of their activities. As the title implies, the impact of war on health receives key consideration, but only after a firm foundation was laid by accurately describing health conditions as they were before the onset of this war. For instance, the health phases of "aging and the aged" are only a part of that important problem, and the author rightly places particular emphasis on how to fit our fathers and mothers into the scheme of living which is changing so rapidly. This type of consideration is characteristic of the treatment of such subjects as "Shelter and Raiment," "Occupation and Recreation," "Mental Calm and Vigor," as well as the more traditional subjects of nutrition, infectious diseases, and maternal and child hygiene.

One unimportant error came to my attention. Endemic typhus was first diagnosed in the United States in 1913 rather than in 1928.

WILTON L. HALVERSON

Medical Parasitology—By James T. Culbertson. New York: Columbia University Press, 1942. 250 pp. Price, \$4.25.

The author presents, according to his statement, a brief description of the animal parasites and the diseases they cause. The book is divided into two parts. It has an introduction which includes a discussion of the historical aspects of parasites and a definition of terms. Part one is concerned with the general considerations such as infections, epidemiology, natural resistance and acquired immunity, diagnosis, specific therapy, and prophylaxis.

The second section discusses the various parasitic diseases and each parasite is described as to its geographic distribution, morphology, life cycle and cultivation, epidemiology, pathogenicity,

immunity, diagnosis, specific therapy, and prophylaxis.

Since the author has discussed the field of parasitic diseases in a book which is confined to 250 pages of text, he of necessity has had to be quite didactic in certain places with regard to the description of some of the parasites especially *Endamoeba histolytica*. Also, in connection with the treatment of amebiasis, the author expresses the opinion that yatren is the drug of choice and that this drug is effective in the treatment of amebic abscess of the liver. He does mention carbarsone as being less extensively employed. At the present time carbarsone, in the opinion of the reviewer, is the drug of choice for the treatment of amebiasis. It should also be stated that no drug given by mouth has proved to be effective for the treatment of liver abscess. No mention is made of diodoquin in the treatment of amebiasis. This drug is reported to be effective in that condition.

In connection with malaria it is stated that sporozoites enter the red blood cells within an hour or so. This is a point that up to the present time has not been determined. The statement is made and it is implied that malaria therapy will cure neurosyphilis. While this is not a book dealing with syphilis, such a statement is misleading since malaria therapy alone is usually not sufficient to cure this disease. Mention is also made of *P. falciparum* for this purpose. In the opinion of the reviewer, *P. falciparum* should never be used for purposes of inducing malaria as a means of treating neurosyphilis. In connection with the use of atabrine in the treatment of malaria, attention should be called to the fact that this agent is not very effective against the gametocytes of *Plasmodium vivax* and *P. malariae*.

In the discussion of immunity in malaria it is said that man loses his acquired immunity and resumes his normal susceptibility when the malaria

parasite is removed from the body. The opinion as to this point is that immunity in malaria is a strain immunity. If an individual has been infected with a certain strain even though the parasite cannot be demonstrated, there is a relative amount of resistance to that strain upon reinfection.

In the discussion of trichuris, in addition to man as a host for this parasite, it should be stated that it is also found in monkeys, dogs, pigs, and other animals. The clinical manifestations associated with this parasite are discussed and while they may be present in some cases of trichuris infestation, they probably would not represent the usual situation.

The filariform larvae of *Strongyloides stercoralis*, are described as unsheathed. Filariform larvae are usually sheathed. In the discussion of the symptoms associated with hookworm infestation "bloody stools" are mentioned. In the experience of the reviewer, this is a most unusual occurrence.

No mention is made of the use of cellophane swab (N.I.H.) in the diagnosis of *Enterobius vermicularis*. This has proved to be the most efficient method of diagnosis of this parasite and has been of great value in studying the epidemiology of enterobiasis.

In a discussion of morphology and life cycle of *Ascaris lumbricoides* no mention is made of unfertilized ascaris eggs. This form of ascaris egg appears frequently in light ascariis infestations which comprise a reasonable proportion of most of the cases of ascaris.

In discussing the tick, *Amblyomma americanum*, the statement is made that it does not transmit any infectious agent. It is now known that this tick can transmit tularemia and recently it has been demonstrated as a vector of Rocky Mountain spotted fever.

For a book which has been reduced in size and which covers the large amount of material and which is meant

for a brief discussion of parasitic diseases, it serves a good purpose. It has sixteen figures and seven tables, the latter are quite valuable in setting forth in tabular form the routes of infection, geographic distribution and treatment of the various parasites. There are twenty-one excellent "bled" plates in the book which are unique in a textbook of this kind. There is also an appendix in which there is described the technical methods for the preparation, preservation, and cultivation of materials. This should prove quite useful for technicians and others responsible for such work.

ALVIN E. KELLER

Report of the Committee on Tuberculosis in War-Time — *Medical Research Council Special Report Series No. 246. New York: British Information Services, 30 Rockefeller Plaza, 1942. 36 pp. Price, \$.25.*

This report should be read by every tuberculosis administrator and health officer. It is a concise presentation of the analysis of existing data on tuberculosis mortality in Great Britain and Scotland. It indicates that, between 1939 and 1941, there has been a real increase in tuberculosis deaths in these countries affecting all age groups, children more particularly in recent months, and the older male age groups as well. It is pointed out that there has been some slackening of the rise during the second year of the war, but that the picture is still unfavorable as compared to prewar figures. The committee reports, however, that considering the known course of tuberculosis, further increases must be expected as war conditions continue.

The most acute problem in the present picture is the increased mortality of children from tuberculous meningitis. This is coupled with a serious problem of bovine infection, and the increased danger incident to the large number of adult cases that have

found their way back into the community.

More than half of this report deals with measures for preventing further infection, controlling known cases, and the rehabilitation of known cases. The schemes presented are not new in principle as they are those simple procedures of case finding and supervision which are now well known to all workers in this field. This report, however, has gone further in that it has advocated a broader use of mass radiography than generally practised, and a far more generous financial attitude toward the tuberculous individual and his family during the stage of active treatment and the post-sanatorium period. If we spend large sums to bring a tuberculous case to arrest, we should invest enough to rehabilitate that case to a productive place in society, and this report sees a place in their planning for the chronic case who may have exhausted all known treatment devices without reaching a real arrest of his disease.

This report indicates what may happen in a nation not actually invaded by the enemy, and what should be done about it. It is timely for us in this country for, even though there is no present evidence that there has been a real increase in tuberculosis death rates, the threat is a real one that may be altered by the increased demands on the laborer in industry, the rationing of food, and the environmental problems incident to an all-out war effort. We would do well to adopt most of the recommendations of this report in America today.

HERBERT R. EDWARDS

Mental Illness: A Guide for the Family—By Edith M. Stern. New York: Commonwealth Fund, 1943. 134 pp. Price, \$1.00.

Doctors and nurses who have responsibility for the recognition and

care of mental illness will welcome this volume with its practical information and guidance for the family. This very readable book has been prepared under the best auspices and can be recommended as reflecting a wholesome and modern viewpoint.

REGINALD M. ATWATER

Elements of Healthful Living—By Harold S. Diehl, M.D. New York: McGraw-Hill, 1942. 295 pp. Price, \$1.75.

In 1934, Dr. Fishbein suggested that the author write a book on personal hygiene that would be appropriate for the lay public. The author's experience as a university physician and professor of preventive medicine and public health was reflected in a book which was both factual and readable. Written in simple, direct style, it had a wide popular appeal and was adopted as a textbook by many college teachers. Largely at the request of these teachers, the contents and references were enlarged and the book was reëdited as a college *Textbook of Healthful Living*. This book was also well received, but the recent necessity to "streamline" these courses led to requests for a condensed volume. The new edition is a response to the present-day need for an accelerated college teaching program.

The book is limited almost entirely to a discussion of personal health problems though there is one chapter on community health. Special emphasis is placed upon nutrition, mental health, and the various factors contributing to physical fitness. The chapters on major health problems, modern parenthood, health problems of adult life, and choice of a medical adviser, are particularly appropriate. There is a delightful freedom from physiological discussion.

The author has made an excellent selection of material to be retained in the new book, and in no place has he omitted essential information from the text. The deletion of food value tables

in the appendix of the new edition will disappoint college hygiene students who found this an easy and accurate guide. A section on personal hygiene problems related to tropic and arctic living would have served a useful purpose to young men anticipating military service.

Here is a discussion of personal health problems which will meet with popular approval and which will maintain the popularity of its forerunner as a textbook for high school and college students.

CHARLES E. SHEPARD

BOOKS RECEIVED

MANUAL OF VETERINARY BACTERIOLOGY. By Raymond A. Kelser and Harry W. Schoening. 4th ed. Baltimore: Williams & Wilkins, 1943. 719 pp. Price, \$6.50.

FUNDAMENTALS OF IMMUNOLOGY. By William C. Boyd. New York: Interscience Publishers, 1943. 446 pp. Price, \$5.50.

FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY. By A. J. Salle. 2d ed. New York: McGraw-Hill, 1943. 643 pp. Price, \$4.00.

NOXIOUS GASES AND THE PRINCIPLES OF RESPIRATION INFLUENCING THEIR ACTION. By Yandell Henderson and Howard W. Haggard. 2d ed. New York: Reinhold, 1943. 294 pp. Price, \$3.50.

INTRODUCTION TO PSYCHIATRY. By W. Earl Biddle and Mildred van Sickel. Philadelphia: Saunders, 1943. 358 pp. Price, \$2.75.

A SURGEON'S FIGHT TO REBUILD MEN. The Autobiography of Dr. Fred H. Albee. New York: Dutton, 1943. 349 pp. Price, \$3.50.

THE PASTEURIZATION OF MILK. By G. S. Wilson. New York: Longmans, Green, 1942. 212 pp. Price, \$5.00.

FAMILIAL NONREAGINIC FOOD-ALLERGY. By Arthur F. Coca. Springfield: Thomas, 1943. 160 pp. Price, \$3.00.

THE SIGHT SAVER. By C. J. Gerling. New York: Harvest House, 1943. 202 pp. Price, \$2.00.

RELIGION AND HEALTH. By Seward Hiltner. New York: Macmillan, 1943. 292 pp. Price, \$2.50.

HEALTHY BABIES ARE HAPPY BABIES. By Josephine Hemenway Kenyon. 3d ed. Boston: Little, Brown, 1943. 343 pp. Price, \$1.50.

MUNICIPALITIES AND THE LAW IN ACTION. 1943 EDITION. CITIES AND THE WAR. National Institute of Municipal Law Officers, Washington, D. C. 611 pp. Price, \$7.50.

THE INFECTIOUS DISEASES OF DOMESTIC ANIMALS. By William Arthur Hagan. Ithaca: Comstock, 1943. 665 pp. Price, \$6.00.

FOOD VALUE CHARTS. Philadelphia: Phila-

delphia Child Health Society, 1942. Set of 12 Charts, 50¢.

AN EVALUATION OF DENTAL HEALTH LITERATURE. By Vern D. Irwin and Netta W. Wilson. St. Paul: Bruce, 1942. 58 pp. Price, 50¢.

DEMOCRACY MEANS ALL OF US. HOW COMMUNITIES CAN ORGANIZE TO STUDY AND MEET COMMUNITY NEEDS WITH SPECIAL SUGGESTIONS FOR DEVELOPING NUTRITION PROGRAMS IN WARTIME. Washington: Office of Defense Health and Welfare Services, The Nutrition Division, 1942.

THE COMMONWEALTH FUND, TWENTY-FOURTH ANNUAL REPORT OF THE GENERAL DIRECTOR FOR THE YEAR ENDING SEPTEMBER 30, 1942.

UNDERSTAND YOUR ULCER. By Burrill B. Crohn. New York: Sheridan House, 1943. 199 pp. Price, \$2.50.

A STUDY OF PATIENTS DISCHARGED ALIVE FROM TUBERCULOSIS SANATORIA IN 1933. By Jessamine S. Whitney and Mary V. Dempsey. New York: National Tuberculosis Association, 1942. 58 pp.

INTERSTATE SANITATION COMMISSION. Annual Report 1942. 60 Hudson St., New York, N. Y.

VENEREAL DISEASES, DIAGNOSIS, TREATMENT AND LABORATORY METHODS. Compiled by the Medical Committee of the Health League of Canada. Toronto: Canadian Department of Pensions and National Health, 1942. 89 pp.

MEDICAL SERVICES IN INDUSTRY. A Selected, Annotated Bibliography with Particular Reference to Health Programs in War Industries. Price, 10¢.

THE FEEDING OF WAR WORKERS. A Selected, Annotated Bibliography. Price, 25¢.

THE METABOLIC COST OF MAINTAINING A STANDING POSITION. With Special Reference to Body Alignment. By Harriet Graham McCormick. King's Crown Press, 1145 Amsterdam Ave., New York, N. Y. 1942. 75 pp. Price, \$1.25.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Tomato vs. Vegetable Juices—How much ascorbic acid are you getting in your tomato juice or vegetable juice cocktails? The mixed vegetable juices are likely to be inferior in nutritive value to ordinary tomato juice, and there is quite a whale of difference in various brands of the latter. The table tells all.

ANON. Vegetable Juice Cocktails. J.A.M.A. 121, 4:258 (Jan. 23), 1943.

In Place of the Ancient Cooler and Tin Cup—Being the standard of purity for drinking water adopted by the Public Health Service, for use in Interstate Quarantine Regulations of common carriers, this report should have a permanent place in your files.

ANON. Public Health Service Drinking Water Standards. Pub. Health Rep. 58, 3:69 (Jan. 15), 1943.

Doff Your Cap to This One—Methods by which the State of Pennsylvania went about the control of pneumonia, and the salutary results achieved are told in instructive detail. Read, ponder it, and do likewise—or better—administrator!

BORTZ, E. L. Therapeutics of Pneumonia on a Statewide Basis. J.A.M.A. 121, 2:107 (Jan. 9), 1943.

Melancholy Tale—Though it be true that he who lives by the sword may perish by the sword, it is more likely that he will perish by famine and pestilence. This hopeful note ends a gruesome but erudite discussion of the parts played by hunger and disease in molding world history. Don't miss it.

CANNON, P. R. War, Famine, and Pestilence. Sci. Month. 46, 1:5 (Jan.), 1943.

Onset and Duration of Rheumatic Fever—Useful statistics about rheumatic fever should find a preferred place in your reading list. In this paper: age at which the infection usually begins; and mean duration of life for the different beginning age groups.

COHN, A. E., and LINGG, C. The Natural History of Rheumatic Cardiac Disease: A Statistical Study. J.A.M.A. 121, 1:1 (Jan. 2), 1943.

Tuberculosis on a Dollars and Cents Basis—Tuberculosis surveys should include preselection with the tuberculin test, even in the low income groups. The program should concentrate upon the adult population of low economic or social status, providing a chest x-ray for all over 15 who are on relief, and all new relievers, and an annual x-ray between the ages of 15 and 25 for all contacts.

EDWARDS, H. R. The Cost of Tuberculosis Control in the Department of Health, New York City, 1940. Milbank Quart. 21, 1:64 (Jan.), 1943.

Vitamins, Synthetic and Natural—Historians will consider the thirties as the decade of great progress in the chemistry of vitamins; let us hope that the forties will prove to be the decade of sensible application of the available knowledge, hopes the writer of this excellent review of our knowledge of vitamin A alcohol, the vitamin D's, 1-ascorbic acid, thiamin hydrochloride and so on through the list to biotin, and inositol.

ELVEHJEM, C. A. Recent Advances in Our Knowledge of the Vitamins. *Sci. Month.* 56, 2:99 (Feb.), 1943.

Yellow Fever Prophylaxis—Vaccination of adults with a potent yellow fever virus results in an immunity that lasts for at least 4 years—within reasonable but variable limits. In children the immunity is neither as complete nor as lasting.

FOX, J. P., and CABRAL, A. S. The Duration of Immunity Following Vaccination with the 17 D Strain of Yellow Fever Virus. *Am. J. Hyg.* 37, 1:93 (Jan.), 1943.

War-Workers' Midday Meals—Eight valid reasons why it is not an easy matter to improve the diets of industrial workers are discussed in this paper which concludes from reported findings that an active educational campaign is needed by the workers, the employers, and especially the managers of company cafeterias.

GOODHEART, R. Dietary Conditions in Industry. *J.A.M.A.* 121, 2:93 (Jan. 9), 1943.

The Lame, the Halt, and the Blind—Findings of a survey of government industries to discover jobs that might be filled by the handicapped are to be set forth in a loose-leaf manual to aid in the recruiting, training, and placing of those former unfortunates who, because of a wartime man power shortage, will find a chance to lead useful lives.

HARVEY, V. K., and LUONGO, E. P. The Physically Handicapped in Industrial Establishments of the Government. *J.A.M.A.* 121, 2:100 (Jan. 9), 1943.

Something New Under the Sun—Though only a few months old, this painless method of childbirth by means of caudal analgesia will soon be a topic for parlor discussion and back fence gossip. Health workers should be ready with the facts here presented.

HINGSON, R. A., and EDWARDS, W. B. Continuous Caudal Analgesia in Obstetrics,

(and) GREASY, T. G., and HESSELTINE, H. C. Continuous Caudal Analgesia in Obstetrics. *J.A.M.A.* 121, 4:225 (Jan. 23), 1943.

Communicability of Leprosy—Even though you may never see a leper, you will be interested in this brief discussion of the epidemiologic aspect of the disease. Imported infection introduced into the Gulf States shows a tendency to spread. Elsewhere in the United States transmission is so rare as to be negligible from a public health standpoint.

McCoy, G. W. Observations on the Epidemiology of Leprosy. *Pub. Health Rep.* 57, 51:1935 (Dec. 18), 1942.

Representative Vitamin Values—Vitamin A, thiamin, ascorbic acid, and riboflavin contents of two hundred-odd fresh foods, are set forth in a table, especially useful in the coming days of restricted food supplies.

MUNSELL, H. E. The Vitamin A, Vitamin B (Thiamin), Vitamin C (Ascorbic Acid), and Riboflavin Content of Common Foods. *Milbank Quart.* 21, 1:102 (Jan.), 1943.

A Comprehensive Civic Attack on Prostitution—Three excellent ways for *not* controlling the spread of venereal diseases by the harassment, medical control, and health departmental supervision of prostitution serve as a striking preamble to a proposal for the repression of prostitution and the custodial care of prostitutes, which would be unquestionably effective if police and courts would cooperate on a permanent basis with health officials—which they can so seldom be depended upon to do.

NELSON, N. A. The Repression of Prostitution for Venereal Disease Control. *Baltimore Health News.* 20, 1:101 (Jan.), 1943.

To Be Taken Without Grain of Salt—Four down-to-earth papers concerned chiefly with syphilis case-holding and contact-tracing by public health nurses have much in them of interest

to all health workers—if only to convince the skeptical ones that sources of venereal infection really are being traced.

PEARCE, D. Major Public Health Battlefront (and three related papers). Pub. Health Nurs. 35, 1:8 (Jan.), 1943.

Shipyard Eye—You will want to be informed about the findings of this New York study of our newest communicable disease. Prompt diagnosis, meticulous cleanliness and disinfection, strict isolation, and observation of contacts should be helpful in controlling it.

SANDERS, M., *et al.* Epidemic Keratoconjunctivitis. J.A.M.A. 121, 4:250 (Jan. 23), 1943.

Trichinae in Your Diaphragm—Once an outstanding health educator, now a publicist, this writer challenges health officials (in *the* health magazine for the laity) to answer the question: why don't you prevent by legislation the feeding of raw garbage to swine? There is no other way, seemingly, to stop infestation with trichinae which about one in every 6 of us picks up at some time or other.

SHELLEY, M. D. Why Don't We Trim Trichinosis? Hygeia. 20, 12:898 (Dec.), 1942.

Twenty-Five Years at Altro—Sheltered workshops have a useful place in any scheme for the rehabilitation of the tuberculous. As a health worker (especially in wartime) you should be interested in all phases of the rehabilitation of the tuberculous pa-

tient; so you will be helped by reading this account of the Altro workshops.

SILTZBACK, L. E. The Sheltered Workshop in the Rehabilitation of the Tuberculous. Milbank Quart. 21, 1:80 (Jan.), 1943.

After Three Years' Experience—Food handlers examinations are not outstandingly productive in venereal case finding, and cases found are not much of a menace as food handlers (it would cost \$164 for each case of syphilis discovered by this method). Though there is more danger of transmitting tuberculosis through food, that menace is not very great either (it would cost \$503 for each active case so found). As a means of finding typhoid, the method is practically barren of results. The most complete examination could not prevent the spread of acute infections.

SWARTOUT, H. O., and DIERKER, H. Food Handlers' Examinations. Weekly Bull. California State Dept. of Public Health. 21, 49:193 (Dec. 26), 1942.

Competence of the Aged a Matter of Nutrition—Elderly people should start the day with a good breakfast which should include some protein. Refined carbohydrates and fat should be used sparingly. Tea, coffee, and alcohol are useful stimulants. In old age, hunger is less acute and vitamin storage begins to fail, hence added vitamins and minerals are indicated. These abridged morsels are spread before you to tempt you to read this useful paper. You may be old yourself some day—you know!

TUOHY, E. L. Feeding the Aged. J.A.M.A. 121, 1:42 (Jan. 2), 1943.

ASSOCIATION NEWS

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

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Bertha Harvey, R.N., 1202 W. 3rd St., Davenport, Iowa, Director, Davenport Visiting Nurse Assn.

Ruth E. Jackson, 411 Pennsylvania, Peoria, Ill., Staff Nurse, Peoria Health Dept.

Mary I. McCarthy, 1226 W. Wisconsin Ave., Apt. 609, Milwaukee, Wis., Director of Public Health Nursing, College of Nursing, Marquette Univ.

Lillian O'Callaghan, State Dept. of Public Health, Boise, Ida., State Orthopedic Advisory Nurse

Madeline H. Roessler, R.N., M.A., 2036 S. 6th Ave., Maywood, Ill., Nursing Supervisor, Cook County Public Health Unit

Epidemiology Section

Guillermo Lopez de Nava-Ysunza, M.D., Ave. Colon 804 Pte, Durango, Durango, Mexico Epidemiologist, State of Durango Dept. of Public Health

Claire W. Twinam, M.D., Dr.P.H., Lakeville State Sanatorium, Middleboro, Mass., Acting Superintendent

Unaffiliated

Massimo Calabresi, M.D., 614 Orange St., New Haven, Conn., Student, Graduate School, Yale Univ.

C. Nash Herndon, Jr., M.D., Bowman Gray School of Medicine, Winston-Salem, N. C., Asst. Professor of Medical Genetics

Lawrence Paris, D.D.S., Quoddy Village, Me., Dental Officer, Quoddy Project, National Youth Administration

Byron S. Proper, 17 Battery Place, c/o R. S. Stokvis & Sons, Inc., New York, N. Y., Technical Engineer

George A. Shipman, M.D., 892 Myrtle St., N.E., Atlanta, Ga., Asst. Surgeon (R), U.S. Public Health Service; Industrial Hygiene Physician, State Dept. of Public Health

DECEASED MEMBER

James E. Ives, Ph.D., Washington, D. C., Elected Member 1932—Industrial Hygiene Section

MERIT SYSTEM

Dorothy Adkins, of the Social Security Board, Washington, D. C., has been added to the staff of the Merit System Study to serve as part-time consultant in the field of tests and measurements.

Lillian Dick Long, Ph.D., formerly

of Miss Adkins's staff on the Social Security Board, will serve as Test Technician. Dr. Long has been Instructor in Psychology at Sarah Lawrence College and has been connected with the Office of War Information in New York, N. Y.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

U. S. CIVIL SERVICE COMMISSION. Public Health Nursing Consultants, 5 grades. See November *American Journal of Public Health*, or write U. S. Public Health Service, Washington, D. C.

Merit System Council, Oregon State Board of Health and Crippled Children's Division, has announced merit examinations in practically all public health fields. See November *American Journal of Public Health*, or write H. J. Sears, Merit System Supervisor, P. O. Box 88, Portland, Ore.

Indiana State Personnel Division announces that applications may be filed for positions in orthopedic nursing, medical positions (5 classes), and local public health director. See November *American Journal of Public Health*, or write Indiana State Personnel Division, 141 South Meridian Street, Indianapolis, Ind.

Physician, man or woman, as director of Division of Maternal, Child and School Hygiene in southern city department of health. Woman physician with pediatric training preferred, public health experience not essential. To operate prenatal, infant and preschool clinics and promote school health program. Salary commensurate with ability and qualifications of applicant. Apply Box J, Employment Service, A.P.H.A.

Southern state department of health seeks several obstetric and pediatric consultants, requiring a minimum of a year's residency in a specialty, immunity to draft and preferably training in public health. Men and women are eligible. Salary \$300 per month plus travel. Apply Box C, Employment Service, A.P.H.A.

Public Health Engineer and director of Division of Sanitation of a city and county health unit; population 145,000 in the Midwest. Salary \$3,180 and travel allowance. Box E, Employment Service, A.P.H.A.

The Flint Civil Service Commission will consider applications for Executive Health Officer of the Flint Department of Health. Applicants must be medical graduates with a valid license to practise medicine in Michigan or eligibility for such license; also must have practised medicine and surgery for five or more

years and had considerable experience in public health work. There will be no written test, qualifications being judged solely from review of experience, education and training and an oral examination. Present incumbent is on military leave of absence under circumstances which will probably extend for a period of five years. Staff consists of over fifty professional and technically trained employees. Probable salary \$5,400. Inquiries should be directed to Foster B. Roser, Director, Flint Civil Service Commission, City Hall, Flint, Mich.

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

Public Health nurses wanted for two-county unit in Michigan. Must be graduates with a minimum of 4 months' public health training or 8 months' training under supervision. Salary \$1,800 per year with travel allowance \$35 to \$41 per month. Must drive and own a car. Address Dr. Koupal, Director, Alger-Schoolcraft Health Dept., Manistique, Mich.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches

of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Wanted: School Dental Supervisor to administer and operate dental program in City schools and clinics in City 50,000 population. Salary \$3,000 to \$3,600 with travel allowance. Those interested should address Dr. W. A. Browne, City Health Department, Alexandria, Va.

Wanted: Chemist and Bacteriologist experienced in the food field for position as director of laboratory operated by national association. Preference given to man familiar with soft drink industry and capable of addressing meetings and writing for publication. Apply in writing giving brief history, references, salary, and draft status. Address American Bottlers of Carbonated Beverages, 1128 Sixteenth St., N.W., Washington, D. C.

The Milwaukee City Service Commission announces an examination for assistant chief in charge of sanitary inspection. Salary first year \$210 per month increasing by \$10 increments annually until a maximum of \$260 per month is reached. Applicants must be citizens of the United States, between 25 and 45 years of age. Those interested may communicate with the Milwaukee City Service Commission, Room 716, City Hall, Milwaukee, Wis.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

M.D., Dr.P.H., interested mental and industrial hygiene, chief of mental hygiene clinic, on staff of psychiatric hospital, speaker, writer, author of books on health, diplomate in psychiatry, professor of psychiatry. Ineligible for military service because of age, healthy, vigorous, able to work hard, now in private practice; would make sacrifice and accept decent but lower remuneration than present income if he could be employed in war industry, preferably New York, New Jersey, or Connecticut. United States citizen. Had important government job

in last war. Speaks and writes several languages. A-504.

Milk sanitarian open for position July 1, 1943. Fifteen years' experience administering and enforcing milk sanitation laws and regulations in midwestern state. References. M-500.

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and bacteriologist and serologist in syphilis and enteric diseases. L-465.

NEWS FROM THE FIELD

URBAN REDEVELOPMENT FIELD STATION ESTABLISHED AT M.I.T.

The Massachusetts Institute of Technology announced recently the setting up by its City Planning Division of an Urban Redevelopment Field Station with funds granted for the purpose by the Albert Farwell Bemis Foundation. Associated in the direction of the Field Station's research program are Professor Frederick J. Adams, head of Technology's City Planning Division, Philip H. Cornick of the Institute of Public Administration, New York, N. Y., and Edwin H. Spengler, Associate Professor of Economics at Brooklyn College and consultant to the National Resources Planning Board. Coöperating agencies include the City Planning Board of Boston, Mass., which has made available to the research group its excellent file of data on physical, economic, and social conditions in Boston, and the American Public Health Association's Committee on the Hygiene of Housing, of which Dr. C.-E. A. Winslow of Yale University is chairman.

One of the important problems now being studied by the Field Station is that of the rehabilitation of urban residential areas where the existing buildings are in sound structural and sanitary condition but where the neighborhood pattern is obsolete. Careful estimates are being prepared of both the capital and operating costs of bringing the environmental conditions in such areas up to a standard in line with modern needs and habits of living, particularly in respect to the planning of the local street system and the adequacy of parks, playgrounds, and other community facilities.

In addition to the municipal costs involved in such a program, studies are also being made of changes in the fiscal

or administrative policies of the local government which might be necessary or desirable if such a program were to be carried out on a city-wide basis, particularly as they might relate to increases in the percentage of tax exempt property and in the costs of maintenance and supervision for a greatly augmented program of neighborhood recreation.

Various proposals for a post-war program of urban reconstruction have been put forward by public and private agencies and it is probable that some scheme involving the participation of federal and local authorities in coöperation with private interests will be adopted as a reëmployment measure when men and materials are again available.

The purpose of the Field Station is to analyze various methods of urban redevelopment which are now receiving consideration with the object of determining their relative value in terms of present-day social and economic conditions.

MEDICAL AND HEALTH STAFF, AMERICAN RED CROSS

The American Red Cross has recently announced the Medical and Health staff as follows:

- Albert McCown, M.D., Dr.P.H., Medical Director, National Headquarters, Washington, D. C.
- Amos Christie, M.D., Assistant Medical Director, National Headquarters, Washington, D. C.
- John F. Busch, M.D., Medical Director, Eastern Area, Alexandria, Va.
- H. E. Kleinschmidt, M.D., Medical Director, North Atlantic Area, New York, N. Y.
- G. Foard McGinnes, M.D., Dr.P.H., Medical Director, Midwestern Area, St. Louis, Mo.
- Milton Rose, M.D., Dr.P.H., Medical Director, Pacific Area, San Francisco, Calif.

EMPLOYMENT OF YOUTH UNDER 18
YEARS OF AGE—POLICY OF THE WAR
MANPOWER COMMISSION

To promote proper utilization of the labor resources of youth with due regard to the welfare of youth and the future needs of the nation, the War Manpower Commission, on January 30, 1943, declared as basic national policy that:

1. School attendance laws and child-labor standards embodied in State and Federal laws be preserved and enforced, and the minimum standard hereinafter listed not be construed to warrant any relaxation of these laws or lowering of the standards embodied in them;

2. No one under 14 years of age be employed full-time or part-time as a part of the hired labor force;

3. Youth under 18 years of age be employed only: after obtainment of proof of age; in work suited to their age and strength; where provision is made for adequate meal and rest periods, sanitary facilities, and safeguards for health and safety; for periods suited to their age and strength, and in no case for more than 8 hours a day or 6 consecutive days, with certain exceptions; during hours of day not detrimental to their health and welfare; and at wages paid adult workers for similar job performance;

4. Youth aged 14 or 15 be employed only when, in addition to the foregoing conditions; qualified older workers are not available; and the employment is not in manufacturing or mining occupations;

5. In-school youth be employed only to the extent that the combined school and work activities involve no undue strain, and that combined school and work hours, at least for youth under 16, not exceed 8 a day;

6. In-school youth not be employed during school hours unless the Area or Regional Manpower Director has determined that temporary needs of an emergency character cannot be met by full use of other available sources of labor, in which case school programs shall be adjusted under plans that provide for the educational progress of those who take employment; avoid interference with the school attendance of those who do not take employment; and avoid the closing of any school or grades therein.

7. In war-time emergency coöperative arrangements between school authorities and employers, the employer to certify to the school authorities that employment will be

in conformity with State and Federal laws and with the standards contained in Sections 3 to 7 above, and the school authorities be responsible for permitting school children to take only those jobs that will contribute definitely to their educational welfare and useful work experience;

8. When young people must be transported to and from work, safe and adequate means of transportation be provided, and the period of work and transportation not exceed 10 hours a day;

9. Where youth under 18 years of age are recruited in groups for agricultural work requiring them to live away from home, prior to placement, assurances be furnished by appropriate community or other agencies that suitable living conditions, sanitary facilities, health protection, supervision, and leisure-time activities will be provided; and in no case youth aged 14 or 15 be recruited for work away from home except where such work is in connection with programs conducted by recognized youth-serving agencies;

10. Any youth interested in work in another area not leave his own area in search of work without first registering for employment locally with the United States Employment Service or another agency designated by the War Manpower Commission; presenting evidence of parental consent; and being referred by such office to a specific job opening where he can be lawfully employed, and where there are suitable arrangements for housing.

RESPONSIBILITY FOR AUXILIARY
HOSPITAL WORKERS

Dr. James A. Crabtree, Executive Secretary of the Health and Medical Committee of the Office of Defense Health and Welfare Services, has announced that it has been decided that it is neither desirable nor practical for the federal government to foster a training program for hospital auxiliary workers. He said that it was felt the problem was entirely local. Some professional groups have contended that the federal government should assume at least partial responsibility for training, placing, and subsidizing auxiliary workers in hospitals, but over a period of months all angles of the proposal have been weighed and the conclusion as announced has been reached.

AWARD TO DR. C. G. KING

The Pittsburgh Section of the American Chemical Society on February 18 awarded to Charles Glenn King, Ph.D., the 1942 Pittsburgh Award "in recognition of Dr. King's outstanding service to chemistry, particularly through his meritorious research and teaching in biochemistry and nutrition." Dr. King is Scientific Director of the Nutrition Foundation, New York, N. Y., and a former resident of Pittsburgh and member of the faculty of the University of Pittsburgh.

INTERPRETATION OF WAR MANPOWER
COMMISSION ORDER CONCERNING
TRANSFER TO ESSENTIAL
INDUSTRY

The *Journal* is informed, through a statement approved by the War Manpower Commission, that individual interpretations of the recent order regarding the transfer of men within draft age to essential occupations have brought apprehension to hospital and health authorities. There is widespread belief among hospital administrators and health officials, it is stated, that the institutions which they represent are not considered essential by the officials of the War Manpower Commission, whereas the contrary is true.

The statement reads in part:

"Several months ago the War Manpower Commission issued a list of Essential Activities, this list to serve as a basis for overall manpower policy, including that of Selective Service. This list of essential services includes 35 broad groups of activities, one of which is titled 'Health and Welfare Services' and includes the following: 'Offices of physicians, surgeons, dentists, oculists, osteopaths, podiatrists, and veterinarians; medical and dental laboratories; hospitals; nursing services; institutional care; auxiliary civilian welfare services to the armed forces; welfare services to civilians.'"

A list of non-deferrable activities and occupations has also been issued through Selective Service designating certain activities in which all occupa-

tions are considered non-deferrable and therefore nonessential. It further designates certain occupations, such as elevator operator, ground keeper, porter and waiter, found in hospitals, health organizations and in nearly all other "Essential Activities," as non-deferrable.

The statement concludes:

"The status of a hospital employee in relation to Selective Service is in no way altered merely by his transfer to some other essential activity, such as aircraft or ordnance production. His status is changed only when he transfers from non-deferrable to a deferrable occupation.

"In summary then, except for the non-deferrable occupations, the position of employees of hospitals and other health services in relation to Selective Service liability is exactly the same as it was before the recent order of the War Manpower Commission."

DR. HARPER RETIRES AS WISCONSIN
HEALTH OFFICER

The retirement of C. A. Harper, M.D., as State Health Officer of Wisconsin was announced in January. Dr. Harper has reached the age of 79 and has been health officer continuously for 39 years, which is said to be a record in such a position in the United States. According to the press, Dr. Harper announced that he had resigned because of less vigorous health and because of a desire to be relieved of some of the details of his position. He will continue in the department as medical specialist in public health. Dr. Harper continues as a member of the Board of Health to which he was first appointed in 1901.

Dr. Harper is a native of Wisconsin, having been born in 1864. He was graduated from the University of Wisconsin in 1889, and received his degree in medicine from George Washington University in 1893. After 10 years of practice in Madison he became State Health Officer in 1904. He was awarded an honorary degree of Doctor of Science by Lawrence College in 1941.

NEW QUOTA FOR NURSES IN TRAINING

According to Paul V. McNutt, Federal Security Administrator, 65,000 young women must enter schools of nursing in the year beginning July 1, 1943, if even the minimum civilian and military needs of the nation are to be met. This exceeds the current quota by 10,000, according to the recommendations of the Subcommittees on Nursing and Hospitals of the Health and Medical Committee, Office of Defense Health and Welfare Services.

Where state nurse registration laws permit, schools of nursing are being urged to contribute to the war effort by accelerating their courses to reduce the usual training period from 3 years to 30 months, and in some instances even a shorter time. In most cases, a college degree subtracts 9 months from the course.

Pointing out that a career woman finds good opportunity in nursing, Alma C. Haupt, R.N., Executive Secretary of the Subcommittee on Nursing, said that she might pursue administration, education, public health, industrial nursing, or any one of a number of hospital specialties.

Federal and private scholarships for nursing education are available. Details regarding these and all phases of student entrance requirements may be secured from the National Committee on Recruitment of Student Nurses, 1790 Broadway, New York, N. Y. Entrance requirements in schools of nursing vary, but in general the following are basic qualifications demanded of an entrant: She must be between 18 and 35 years old, be physically fit, have at least a high school education, and may be either married or single.

RECRUITMENT OF NURSES

New staff appointments to meet more effectively the nation-wide shortage of nurses have been announced by the National Nursing Council for War

Service, which represents the major professional nursing organizations.

Estelle Massey Riddle, formerly Director of the Homer G. Phillips Hospital School of Nursing, St. Louis, Mo., will be consultant on Negro nursing in relation to the war effort. Among her responsibilities will be assistance in recruiting student nurses, counseling with schools of nursing on ways to increase their resources, and recruitment of graduate nurses for military and civilian services. Mrs. Riddle is a graduate of Columbia University and has served on the staff of the Julius Rosenwald Foundation.

Edith H. Smith, formerly Director of the Leland Stanford University School of Nursing and until recently nursing consultant to the Health and Medical Committee of the Office of Defense Health and Welfare Services, will be college recruitment representative, visiting colleges in the eastern states to present the opportunities in nursing before undergraduates, deans, and vocational counselors.

Another new project, that of field service, will soon be set up with the aim of assisting schools of nursing to accelerate their basic course and to make up any deficiencies which might prevent their graduates from being eligible for service with the armed forces through the American Red Cross Nursing Service.

MISS DEUTSCH JOINS PAN AMERICAN SANITARY BUREAU STAFF

The appointment of Naomi Deutsch, R.N., to the Nursing Staff of the Pan American Sanitary Bureau has been announced. Miss Deutsch will assist the Bureau in South and Central American countries in public health nursing, nursing education, and hospital nursing. Since 1935 Miss Deutsch has been Director of Public Health Nursing for the Children's Bureau, Washington, D. C.

U. S. PUBLIC HEALTH SERVICE FELLOWSHIPS IN HEALTH EDUCATION

The Surgeon General of the U. S. Public Health Service has announced that 20 fellowships providing \$100 per month for 12 months, plus tuition, have been made available through a grant from the W. K. Kellogg Foundation for training at the University of North Carolina leading to a Master's degree in public health.

Pointing out that there is a current need for qualified persons with a thorough understanding of both education and public health, Dr. E. R. Coffey, Assistant Surgeon General in charge of the Division of Sanitary Reports and Statistics, indicates that these stipends will provide for a year's training, 9 months being intramural work and 3 months supervised field experience and he also anticipates employment following successful completion of basic training.

"A candidate for the position of health educator should have not only sound scientific training but good personal health and a pleasing appearance. There is great need for the health educator to have creative ability, leadership qualities, sound judgment, common sense, and adaptability. Since the success of the person in this field depends upon the latter qualifications as well as upon academic achievement, the awarding of the fellowships will be made accordingly.

"In view of the fact that the field of community health education is new, standardized and specific training as a qualification for the fellowships could not be fairly requested. However, it is considered pertinent and important if the candidate is able to present a background including some or all of the following areas of knowledge and skill:

"1. Basic cultural education, including the development of appreciations and skills in the use of the English language.

"2. Basic science education including physics, chemistry, biology, physiology and bacteriology.

"3. Training in education and educational psychology.

"4. Social science education to provide an appreciation of the importance of respect for human personality and government."

The training will begin at Chapel Hill, N. C., March 20, 1943. The summer quarter will be spent in the field. Training ends in March, 1944. Fellowships are open to American citizens between the ages of 19 and 40 inclusive. Minimum educational qualifications include a Bachelor of Science degree, or its equivalent, with major emphasis on basic health and medical sciences, education and the social sciences. Persons interested should apply to the Surgeon General, U. S. Public Health Service, Washington, D. C.

U. S. PUBLIC HEALTH SERVICE DRINKING WATER STANDARDS

The standards of purity for drinking water recommended by the Advisory Committee on Revision of the 1925 Drinking Water Standards, appointed by the Surgeon General in February, 1941, have been printed in the January 15, 1943, issue of *Public Health Reports*, Volume 58, No. 3. Reprints are available from the Superintendent of Documents, Washington, D. C., at 10¢ per copy. Reprint 2440 should be specified in ordering.

The *Journal of the American Water Works Association* reproduces the drinking water standards in its January, 1943, issue. Reprints will not be available from the American Water Works Association.

OFFICERS OF THE SOUTHERN BRANCH, A.P.H.A.

The Secretary of the Association's Southern Branch announces the officers for 1942-1943 as follows:

President, C. F. McClintic, M.D., Charleston, W.Va.

1st Vice President, E. C. Hooper, M.D., Richmond, Va.

2nd Vice President, H. J. Darcey, Oklahoma City, Okla.

3rd Vice President, Donna Pearce, R.N., Washington, D. C.

Secretary-Treasurer, R. H. Hutcheson, M.D., Nashville, Tenn.

COMING VISIT OF BRISTOL, ENGLAND, MEDICAL OFFICER OF HEALTH

On the invitation of the American Public Health Association and the Public Health Association of New York City, British Information Services have announced that Dr. Robert Hughes Parry, Medical Officer of Health of Bristol, England, is expected to be in the United States during March and April and available for public addresses bearing on relationships between public health and the war effort.

Dr. Parry, who was born in 1895, is a graduate of the University of London and has served in experimental pathology in the Bristol Cancer Hospital and as School Medical Officer in Bristol for a number of years. He is professor of preventive medicine at the University of Bristol, and Health Officer of the Port as well as of the city.

It is suggested that state public health associations and other groups consider whether their state programs would permit the appearance of Dr. Parry, whose schedule is being prepared. Those interested should communicate with the Executive Secretary of the Association, 1790 Broadway, New York, N. Y.

EPIDEMIC CEREBROSPINAL FEVER

For the first time since 1929 the reported incidence of cerebrospinal fever during 1942 approached epidemic status. During the year 1942 there were 32 cases reported, with 9 deaths. This was in contrast to the preceding 4 years when the average of reported cases per year was 6. The last major epidemic in San Francisco was in 1929 when there were 88 cases reported with 81 deaths. The history of cerebrospinal fever has indicated that there are periods of high incidence recurring at fairly long intervals.

Increased reporting continues into 1943. During the month of January there were 16 cases reported to the Department of Public Health, of which 2

were listed as non-local. Among the 16 cases there were 2 deaths. Twelve of the cases were males and 4 females. The age incidence showed that 4 were in the group under 5 years, 5 in the group 5 to 20 years, 6 over 20 years, and 1 on which the age was not stated. Fifteen of the cases were treated in hospitals and 1 case was treated at home. As to occupation, 5 of the cases were listed as in the armed forces and 4 reported as shipyard workers.

At the time of this reporting in February the increased incidence appears to be continuing.

PRIZE AWARD FOR RESEARCH ON ALCOHOLISM

The Research Council on Problems of Alcohol, an affiliated body of the American Association for the Advancement of Science, has announced an award of \$1,000 which will be available for outstanding research on alcoholism during 1943, and which is open to any scientist in the United States, Canada, or Latin America. The research for which the award will be granted must contribute new knowledge in some branch of medicine, biology, or sociology important to the understanding, prevention, or treatment of alcoholism. The Committee of Award will consist of a representative of the American Association for the Advancement of Science and four representatives of the Scientific Committee of the Research Council on Problems of Alcohol. Those interested may communicate with Harry H. Moore, Ph.D., Director of the Council, Bronxville, N. Y.

THE KENNY METHOD

Instruction in the Kenny Method for physicians and nurses will be started at an early date at New York University. Information relative to these courses may be secured from Dr. George Deaver, Educational Building, New York University.

DR. CALDERONE APPOINTED DEPUTY
COMMISSIONER IN NEW YORK CITY

Ernest L. Stebbins, M.D., Health Commissioner of New York City, has announced the appointment of Frank A. Calderone, M.D., as Deputy Health Commissioner. He succeeds George T. Palmer, Dr.P.H., who resigned to become the A.P.H.A. Associate Field Director.

Dr. Calderone, who is a graduate of New York University Medical College and received his Public Health Degree from Johns Hopkins University's School of Hygiene in 1937, entered the public health field as Epidemiologist for the New York State Health Department. In 1938 he was appointed District Health Officer of the Lower East Side in New York City, and has been Secretary of the Department since July, 1942. In 1940 Dr. Calderone organized the Mothers Health Organization of the Lower East Side which aroused national interest for its method of enlisting groups of mothers through various community organizations under natural key leaders, and which successfully carried on its own nutrition program. He has been Assistant Professor of Preventive Medicine at New York University. He is a member of the Diphtheria Subcommittee of the Committee on Administrative Practice of the A.P.H.A.

"CURRENT MORTALITY ANALYSIS"

J. C. Capt, Director of the Bureau of the Census, Department of Commerce, Washington, D. C., has announced the publication of Volume 1, No. 1, of *Current Mortality Analysis*, a new publication of the Census Bureau based on the returns of a 10 per cent sample of death certificates received at vital statistics offices. Mr. Capt has announced that, because of the importance in these times of obtaining all information on public health conditions as promptly as possible, the Bu-

reau of the Census has revised its procedure so that certain statistics of national mortality can be obtained many months in advance of the time they were previously available.

The new publication is expected to appear each month approximately 7 weeks after the close of the month in which the deaths occurred. It is especially designed for a limited distribution among persons whose work requires that they keep abreast of public health trends in the United States during the war. It is believed that through this publication public health officials, vital statisticians, epidemiologists, and others concerned with the conservation of man power and the war production program will be able to keep themselves aware of the effect of changes that are taking place in the health environment of the population in various regions of the country. The Census Bureau will honor requests from persons who wish to receive the publication without cost, provided the full title and mailing address are given.

COLONEL RUSSELL TO GIVE BIGGS
MEMORIAL LECTURE

The Committee on Public Health Relations of the New York Academy of Medicine has announced that the Hermann M. Biggs Memorial Lecture will be given in Hosack Hall at the New York Academy of Medicine on April 1, at 8:30 P.M. by Lt. Colonel Paul F. Russell of the Medical Department, Army of the United States, who is the Chief of the Tropical Disease and Malaria Control Section in the Division of Preventive Medicine. His subject will be Malaria and Its Influence on World Health.

The lecture is open to the general public and is in memory of Dr. Hermann M. Biggs, late Commissioner of Health in the New York State Department of Health and a distinguished physician of New York City.

N.T.A. APPOINTS WAR EMERGENCY COMMITTEE

The National Tuberculosis Association, New York, N. Y., has announced the appointment of a War Emergency Committee for the purpose of keeping tuberculosis control programs adjusted to wartime conditions and to plan for post-war control of the disease.

The chairman of the committee is Dr. J. Burns Amberson, Jr., president of the association, and other members are Dr. Harry S. Mustard, director, Delamar Institute of Public Health, Columbia University; Lt. Col. Esmond R. Long, M.D., in charge of the Tuberculosis Section in the Office of the Surgeon General, U. S. Army, who is on leave from his place as director of the Henry Phipps Institute, Philadelphia; Dr. Herman E. Hilleboe, in charge of the Tuberculosis Section, U. S. Public Health Service, and Robert G. Paterson, Ph.D., executive secretary, Ohio Public Health Association.

LAND-FILL GARBAGE DISPOSAL METHOD IN PATENT LITIGATION

The *Public Works Engineers' News Letter* for January indicates that the sanitary land-fill system of refuse disposal practised at New York City has become the basis of a patent infringement suit filed on December 18. The holder of the patents covering the land-fill method, Lewis M. McCarthy of New York City, originally made application on November 6, 1933, and was granted patents on August 4, 1936, and on July 4, 1939, relating to the disposition of refuse by dumping and covering the material with earth excavated from a trench directly in front of the filled area.

New York City has made extensive use of land-fills during the past 6 years, reporting that approximately 11,000,000 cu. yds. of refuse were disposed of by this method in 1941 at an average unit cost of \$0.069 per cu. yd. This cost is

approximately 30 per cent of New York's cost of disposal by incineration. Widespread adoption of the land-fill method at army cantonments has been reported during the past year.

MASSACHUSETTS PUBLIC HEALTH ASSOCIATION

The Massachusetts Public Health Association held its annual meeting on January 28 in Boston electing the following officers:

President, Harold W. Stevens, M.D.

1st Vice President, L. Jackson Smith, M.D.

2nd Vice President, Charles F. Wilinsky, M.D.

Secretary, Raymond S. Patterson, Ph.D.

Treasurer, Elna I. Perkins, M.S.

Executive Committee, Manfred Bowditch, A.B.; Ethel G. Brooks, R.N., B.S.; G. Donald Buckner, S.B.; Roy F. Feemster, M.D.; John W. Williams, M.D.

Representative to the Governing Council of the A.P.H.A., Charles F. Wilinsky, M.D.; (Alternate) Alton S. Pope, M.D.

Representatives to Executive Committee elected by Sections to serve for 1943, Board of Health Section, Vlado A. Getting, M.D.; Laboratory Section, Donald L. Augustine, Sc.D.; Child Health Section, Sallie H. Saunders, M.D.; Food and Nutrition Section, Dorothy Duckles Hudson.

Henry D. Chadwick, M.D., retired as President after two terms. G. Donald Buckner of Worcester retired as Secretary-Treasurer on account of his removal to Worcester to become the Secretary of the Southern Worcester County Health Association. He has served as Secretary since 1934.

DR. FELIX J. UNDERWOOD

The December issue of the *Mississippi Doctor*, the official organ of the Mississippi State Medical Association, carries an editorial dedication to Felix J. Underwood, M.D., State Health Officer, in recognition of the honor that has been bestowed upon him in his election as President-elect of the American Public Health Association at the 71st Annual Meeting of the Association in St. Louis last October.

NEW MEXICO HEALTH CONFERENCE

On January 18 a medical and public health conference was held in Albuquerque, N. M., with participation from members of the staff of the U. S. Indian Medical Service, the New Mexico Third Health District, and the New Mexico Department of Public Health. Emphasis was put on immunization procedures, on sulfaguanadine in treatment of dysentery and on practical application of nutrition, with particular reference to native plants. Dr. Ralph B. Snavelly, District Medical Director for the Office of Indian Affairs, presided.

PAINLESS CHILD BIRTH

A new type of spinal anesthesia has been announced for use in obstetrics, which has been developed by Robert A. Hingson, M.D., and Waldo B. Edwards, M.D., officers of the U. S. Public Health Service stationed at the Marine Hospital at Stapleton, Staten Island, N. Y.

According to the *Journal of the American Medical Association* for January 23, the technic involves continuous caudal analgesia with a solution of metycaine. They report 589 deliveries without maternal mortality and with but three infant deaths, all without reference to the method of analgesia employed.

DR. NEUPERT APPOINTED WISCONSIN
STATE HEALTH OFFICER

Carl N. Neupert, M.D., has been appointed State Health Officer of Wisconsin to succeed Dr. C. A. Harper. He has been a member of the staff of the State Board of Health since 1936. Dr. Neupert was born in 1897, and is a graduate of Washington University School of Medicine, St. Louis, Mo., 1925.

CORRECTION

The attention of the Editor has been called to the fact that the listing of Baccalaureate degrees awarded in public health nursing for the academic year

ending June 30, 1942, by the University of Minnesota as presented on page 1364 of the *AMERICAN JOURNAL OF PUBLIC HEALTH* for December, 1942, and as compiled from figures assembled by the National Organization for Public Health Nursing, is in error. Instead of 378 degrees granted, the figure should be 51.

PERSONALS

Central States

CLIFFORD J. BALDRIDGE, M.D.,† Health Commissioner of the City of Hamilton and Butler County, Ohio, for 20 years, has resigned, effective January 1.

DANIEL C. BARRETT, M.D., C.P.H.,† formerly of Bloomington, Ind., has been detailed by the U. S. Public Health Service to serve as Health Officer of Montgomery County, with headquarters in Independence.

ALLEN A. FILEK, M.D.,† who has been District Health Officer in Green Bay, Wis., has been appointed Director of the Division of Tuberculosis and the Division of Local Health Services of the State Board of Health. He succeeds EDWIN H. JORRIS, M.D.,† who has joined the armed forces.

W. R. GIEDT, M.D., M.P.H.,† formerly Director of Laboratories, South Dakota State Board of Health, Pierre, S. D., was appointed Assistant State Health Officer, October 1, 1942. He succeeds G. J. VAN HEUVELEN, M.D., who entered the Army. Upon the death of J. F. D. COOK, M.D., Superintendent of the State Board of Health, Dr. Giedt was designated as Acting Superintendent until a successor to Dr. Cook is appointed.

SIMON A. KING, M.D., has been named Health Officer of North Dansville, N. Y., to succeed ALDEN J. TOWNSEND, M.D., who resigned to enter military service.

* Fellow A.P.H.A.

† Member A.P.H.A.

GREGORY J. NORDENBROCK, M.D., of St. Marys, Ohio, has been appointed Health Commissioner for Shelby County, effective December 15. He succeeds HARRY WAIN, M.D.,† of Sidney, resigned.

S. L. PEARLMAN, M.D., M.S.P.H.,† P.A. Surgeon (R), U.S.P.H.S., has been transferred from the Health Department of Omaha, Nebr., where he served as Communicable Disease Control Officer to the Health Department of Chicago, Ill., as Director of Venereal Disease Clinics.

HERBERT L. PETTITT, M.D., of Morrison, Ill., who recently resigned as Assistant State Health Director to resume private practice, has been appointed Chief of Emergency Medical Services in the Illinois Defense Council. He succeeds ROLAND R. CROSS, M.D.,† of Springfield, State Health Director. Dr. Pettitt will devote only part time to the position.

ROBERT W. REID, M.D., of Union City, Ind., has been appointed Health Officer of Randolph County, to succeed ANDREW M. BRENNER, M.D., of Winchester, who has entered the Navy.

GARFIELD A. REUTTER, M.D., formerly of Bigfork, Minn., is the new Health Officer of Cherokee County.

Eastern States

W. RODERICK BROWN, M.D., Pittsburgh, Pa., has been appointed to the staff of the Medical Division, Office of Civilian Defense, Washington, D. C., to supervise the training of Negro physicians in emergency medical service for civilian defense. Dr. Brown has been a member of the medical staff of the Tuberculosis League of Pittsburgh and the Chest Unit of the University of Pittsburgh Medical Center.

WILLIAM J. CARRINGTON, M.D., of

Ventnor, N. J., Vice-President of the American Medical Association, has been commissioned a lieutenant-colonel in the Army Medical Corps and expects to take charge of an Army hospital soon.

MRS. INA J. DURFEE, of Dedham, Mass., was appointed Executive Secretary of the Hartford Tuberculosis and Public Health Society, Inc., on January 14, to replace S. DOUGLAS POLHEMUS † who has gone into the Army.

GENE B. HABER, M.D., Passed Assistant Surgeon, U. S. Public Health Service (R), has been assigned to the New Hampshire State Board of Health and is serving as health officer of the Eastern Health District with offices in Exeter, N. H. He replaces EDWARD W. COLBY, M.D.,† who is now in charge of the Division of Epidemiology and Venereal Disease Control at the State Headquarters, in Concord.

DR. HENRY C. SHERMAN, of Columbia University, New York, N. Y., delivered the Mary Swartz Rose Memorial Lecture on February 17 at the New York Academy of Medicine. The subject of the lecture was "The Concept and Practical Significance of Internal Environment." The meeting was sponsored by the Greater New York Dietetic Association.

RACHEL E. SPINNEY, M.S.P.H.,† who has been Health Education Secretary with the Hartford Tuberculosis and Public Health Society, Hartford, Conn., has resigned to accept a position with the Tuberculosis Institute of Chicago and Cook County, Ill., as Director of Health Education.

A. HAMILTON STEWART, M.D.,† of Indiana, Pa., has been appointed Secretary of Health of Pennsylvania, as announced by Governor Edward Martin. Dr. Stewart has served during the last 4 years first as Deputy Secretary then as Acting Secretary and finally as Secretary during the

* Fellow A.P.H.A.

† Member A.P.H.A.

last month of the preceding administration of Governor James.

Southern States

CAROLINE H. CALLISON, M.D.,† of Chatom, Ala., will serve as Health Officer of Washington and Clarke Counties.

JULIUS E. DUNN, M.D., of Florence, Ala., is the new Health Officer of Etowah and Calhoun Counties, with headquarters in Anniston.

JEAN HENDERSON,† formerly Public Relations Consultant with the Florida State Board of Health, Jacksonville, has been appointed Information Consultant to the Health and Medical Committee, Office of Defense Health and Welfare Services, Washington, D. C.

KATHARINE F. LENROOT,* Chief of the Children's Bureau, U. S. Department of Labor, Washington, D. C., was awarded the Rosenberger Medal for "notably great service in the promotion of human welfare," at the University of Chicago on December 18.

PERRIN H. LONG, M.D., Professor of Preventive Medicine at Johns Hopkins University School of Medicine, Baltimore, Md., has received the award of the Southern Medical Association for original work by one of its members. The award was made in recognition of his studies on the sulfonamides.

G. FOARD MCGINNES, M.D., DR.P.H.,* has been appointed Medical Director of the Midwestern Area of the American National Red Cross with headquarters in St. Louis, Mo., effective February 15. Dr. McGinnes is a graduate in medicine of the University of Virginia and in public health from Johns Hopkins. He has served with the Virginia State De-

partment of Health and the State Department of Health of Tennessee, where he recently has been Director of the Venereal Control Division. For several years Dr. McGinnes was Secretary of the Southern Branch, American Public Health Association.

ELISHA MOORE, M.D., of Livingston, Health Officer of Sumter County, Ala., has also been placed in charge of the Greene County Department of Health.

RALPH E. TARBETT,* Chief Sanitary Engineer of the Office of Civilian Defense, has been recalled to the U. S. Public Health Service by the Surgeon General. He will assume direction of the Federal Facility Security Program as it relates to domestic water supplies, responsibility for which was assigned to the Public Health Service by Executive Order of President Roosevelt on May 19, 1942. GORDON E. MCCALLUM, Assistant Chief Sanitary Engineer, has been named to serve as Acting Chief Sanitary Engineer in the Office of Civilian Defense, in place of Mr. Tarbett.

FRANK B. WOOD,† Engineer (Sanitary), with the U. S. Engineer Department, was transferred on January 1 to the office of the Mississippi River Commission and the Lower Mississippi Valley Division at Vicksburg, Miss., from the Vicksburg, Miss., District.

Western States

LT.-COL. GEORGE H. HAM, of Culver City, Calif., has been appointed Base Surgeon at the Army Air Corps Base in Key Field, Miss. He has been located in Washington, D. C., while serving as The Surgeon, of the Ferry Command.

Canada

ADA I. WALLACE, M.D., Medical Health Officer for Emerson and the rural municipalities of Franklin and Mont-

* Fellow A.P.H.A.

† Member A.P.H.A.

calm, was recently appointed first woman Coroner in the history of Manitoba, it is reported.

DEATHS

GEORGE WASHINGTON CRILE, M.D., of Cleveland Heights, Ohio, world renowned surgeon, died January 7, at the age of 78.

DR. LEE HOLLISTER FERGUSON, Director of Health Service for Western Reserve University, Cleveland, Ohio, died January 27.

WILMER KRUSEN, M.D., of Philadelphia, Pa., died February 9. He had served as Director of Public Health of Philadelphia, and became President of the Philadelphia College of Pharmacy and Science in 1927, and was President-emeritus since 1941.

DR. EZRA KIMBALL SPRAGUE, former Medical Director of the North Atlantic District of the U. S. Public Health Service, died February 2, in Brooklyn, N. Y.

CONFERENCES AND DATES

American Association of School Administrators. St. Louis, Mo. February 26-March 2.

American Association of Social Workers. Cleveland, Ohio. May 22-23.

American Society of Planning Officials. Joint Meeting of National Conference on Planning and American Institute of Planners. New York, N. Y. Week of May 17.

American Water Works Association—Minnesota Section—Nicollet Hotel, Minneapolis, Minn. March 12 (from noon)—13. New York Section—Hotel Syracuse, Syracuse, N. Y. March 25-26.

Canadian Section—Royal Connaught Hotel, Hamilton, Ontario, Can. April 7-9.

Pacific Northwest Section—Bellingham, Wash. May 7-8.

Conference on War Winning Water Works Operations. Carter and Statler Hotels

(co-headquarters), Cleveland, Ohio. June 15-18.

Civil Service Assembly—Western Regional Conference. Yosemite National Park, Mariposa, Calif. June 5-6.

Greater New York Safety Council—14th Annual Convention. Pennsylvania Hotel, New York, N. Y. March 23-25.

Idaho Public Health Association, Boise, Idaho. May 31-June 1.

Illinois Public Health Association. Chicago, Ill. May 17-18.

Iowa Public Health Association. Des Moines, Iowa. April 27-28.

Massachusetts Public Health Association. Boston, Mass. April 29.

National Association of Housing Officials. Regional IV. Savannah, Ga. March 18-19.



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The Army's Contribution to Industrial Hygiene*

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*Chief, Occupational Hygiene Branch, Office of the Surgeon General,
War Department, Washington, D. C.*

WHEN warfare became mechanized and large numbers of soldiers were enrolled in what is termed "The Armored Forces," industrial hygiene came to the Army—Military occupational hygiene.

The mechanization of warfare brought to the soldier, in addition to hazards of combat, certain health hazards which formerly were associated with various types of industry—hazards of fumes, gases, and dust, hazards of maintenance and repair with their job as soldiers in the Armored Forces. Associated with these considerations are those resulting from military activities all over the world necessitating detailed studies of proper rations and proper clothing, and the important matter of water consumption. From the need to know all that could be ascertained about these important items, there was born the Armored Force Medical Research Laboratory at Fort Knox devoted to maintaining and increasing the physical effi-

ciency of the soldiers in the Armored Forces—especially the tank crews. This is one of the most important phases of the application of industrial hygiene in the Army.

Physiologists, physicists, pathologists, ventilation experts, chemists, biochemists, nutrition experts are determining what must be done to protect the health of the soldier in a mechanized war, fought under all varieties of climate. The soldier in many phases of Army life is of necessity a skilled craftsman—a highly trained mechanic. The Armored Force trains thousands of young men in many branches of mechanics, including communications, and in so doing is making a tremendous contribution to the welfare of the nation.

It is the aim of the Army that these men learn their respective skills under the most favorable conditions, and are protected from health hazards both while learning and practising their jobs.

The Army employs not only soldiers but industrial workers, and is now probably the largest employer of labor in the country. The Army owns and

* Presented before the Industrial Hygiene Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

operates more than 160 industrial plants, and owns more than 250 industrial plants which are operated under contract. These plants embrace every phase of the manufacture of the munitions of war, explosives and related chemical industries, and the maintenance and repair of mechanized equipment and aircraft. These industrial establishments include many whose employees number ten to twenty and thirty thousand industrial workers, an ever increasing number of whom are women. In all, as nearly as can be ascertained under conditions of rapid expansion, more than 600,000 men and women work in these plants.

Out of the needs created by this situation there was established in the Division of Preventive Medicine in the Surgeon General's Office, an Occupational Hygiene Branch. The functions of this branch are to satisfy the responsibilities of the Army, in its rôle as an employer, to its employees. In this respect the Army is in the same position as any other employer. Working conditions must be safe, unavoidable health hazards must be controlled, environmental sanitation must be enforced, and adequate medical service, of the type that has become standardized in well run American industrial establishments, must be maintained.

In order to fulfil these functions two main activities have been undertaken:

1. Wherever indicated, industrial physicians with the necessary training and experience, have been commissioned in the Medical Corps and assigned to the Army-operated plants. Acknowledgement is here made to the medical directors of American industry whose coöperation has made this course of action possible. Industrial physicians have also been assigned as industrial medical officers to the service commands. Industrial hygiene engineers have been commissioned in the sanitary

corps and have also been assigned to Service Commands and to those establishments where they are needed.

2. There has been established an industrial hygiene laboratory, located in the School of Hygiene and Public Health of Johns Hopkins University. The main function of this laboratory is to study environmental conditions in Army-operated plants, make special inquiries, and elaborate methods of controlling health hazards. Nothing is static. New inventions, new war agents, new manufacturing processes are the order of the day, all bringing their own peculiar problems of health and safety.

In supervising health conditions in the Army-owned, contractor-operated plants, the Surgeon General's Office is most fortunate in having the assistance of the Division of Industrial Hygiene of the U. S. Public Health Service with their vast experience in this field. The medical departments of these contractor-operated plants are not staffed with military personnel but are employees of the company physicians and their assistants. The aid of the Public Health Service makes it possible to carry on a complete program.

The Occupational Hygiene Branch maintains an active liaison with the various Army Departments, particularly the Ordnance Department, the Chemical Warfare Service, and the Air Force, who contribute their technical knowledge and experience to the health problems, often complex, which are encountered.

The progress of industrial medicine and industrial hygiene in this country in the past 25 years has been continuous and has reached a high point of efficiency. It is the aim of the Army to provide the benefits of this progress to both soldiers and civilian employees, as well as to contribute to it out of its own experience.

Industrial Hygiene Program of the U. S. Navy*

REAR ADMIRAL C. S. STEPHENSON (MC), U.S.N., AND
COMMANDER OTTO L. BURTON (MC), U.S.N.

*In Charge, Division of Preventive Medicine, Bureau of Medicine and
Surgery, U. S. Navy; and In Charge of Section of Industrial
Health, Division of Preventive Medicine, Bureau of
Medicine and Surgery, U. S. Navy,
Washington, D. C.*

THE rôle that our government expects all industrial physicians and hygienists to play in the war effort is to institute measures to promote and maintain the health, well-being, and morale of civilians. Such measures should be applied to all classes of population but especially to the industrial workers whose working efficiency is of especial importance.

With industrial establishments being rapidly expanded, and new plants being constructed we will need more and more workmen. Minors, women, retired employees, and workers with physical defects which disqualify them for military service are making our industrial health problems more acute. These groups will have to adjust themselves to more strenuous tasks, more concentrated efforts, and probably longer hours than those to which they have been accustomed. The health of these employees is of paramount importance. The government is depending upon you to institute measures now to prevent any shortage of plant man power due to preventable illness or injury.

It has come to our attention recently

that the employees of a certain firm suggested that rest periods and lunch period be discontinued. They offered to eat lunch while continuing at work. Obviously such a scheme would not be conducive to maximum production. Another plant has permitted apprentices to work 7 days every week in order to shorten the duration of the apprenticeship period. A 7 day work-week is undesirable, regardless of age, is injurious to health, and a threat to the youth of the country.

If we could have assurance that our war effort would be successful in a matter of a few months we could speed up production by long days and weeks and probably get away with it. On the other hand, since we do not know how long we will be in this state, we should eliminate the temporary sprinting and buckle down for a long distance run with our speed regulated to meet the situation.

The Council on Industrial Health of the American Medical Association some time ago prepared an outline as a guide for those interested in industrial medical relationships and the objectives aptly stated were:

1. Prevention of disease or injury by establishing proper medical supervision over in-

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dustrial materials, processes, environments and workers.

2. Health conservation of workers through physical supervision and education.

3. Medical and surgical care to restore health and earning capacity as promptly as possible following industrial accident or disease.

In recognition of its responsibility for the maintenance of the health of its industrial employees, the Navy for many years has had an active safety program at its numerous shore establishments. In addition to industrial accident prevention it has recognized that the basic principle of health promotion was eminently worthy of consideration. Because of the enormous expansion in naval construction additional problems and exaggeration of old ones had to be coped with. So two years ago the Navy began to enlarge its industrial health program from the nucleus of its existing organization.

We all realize the decisive part industry must play in the present war and that victory will ultimately depend upon surpassing the enemy in producing ships, planes, munitions, and supplies of all kinds with which to support the armed forces.

Adverse working conditions result in industrial absenteeism, and surely this loss of time cripples defense. Efficiency and maintenance of health cannot be divorced. Today industrial efficiency must be measured in terms of military gain or loss. Recently one of the navy yards launched a fine, new capital ship built without a single fatality. That represents a military victory.

ORGANIZATION

1. Section of Industrial Health

The Navy proceeds with the belief that dangerous material can be handled safely and that any mechanical job can be performed safely if proper study is given in advance and the necessary precautions are observed.

Early in 1941 a new Section of In-

dustrial Health under the Division of Preventive Medicine was set up in the Bureau of Medicine and Surgery. The medical officer in charge of this section has been formally trained in industrial hygiene and the fundamentals of safety engineering and also possesses a degree in public health. This section coöperates with the Shore Establishments Division of the Navy Department to conserve the health and prevent disease and injury in Navy industry. It operates in the major areas of industrial hygiene by the establishment of proper control over the industrial environment in navy shore establishments; by analyzing occupational disability reports and making recommendations to the field in regard to detection and elimination of potentially hazardous working conditions; by preparing information on various hazardous materials and processes; and by coöordinating the efforts of the industrial hygiene field personnel.

2. The Field Organization

Over 50 navy medical officers have completed postgraduate instruction in industrial hygiene and many more have developed varying degrees of proficiency through personal experience in the navy industrial shore establishments. Such medical officers have been assigned to navy industrial shore establishments to be in charge of distinct units of industrial hygiene under the Senior Medical Officer. The majority of these officers are putting full time on industrial health work and coöperating with the station safety officer so as to provide and promote an adequate safety and health program.

Each principal industrial station has assigned in addition, one or more officers who are graduates of schools of chemical engineering, sanitary engineering, mechanical engineering or chemistry, and trained in industrial hygiene. These officers are equipped with neces-

sary laboratory and field equipment to help the medical officer in handling problems of dust, fumes, illumination, noise, ventilation, etc.

The functions of the medical officer for industrial hygiene, and those of the safety officer are separate, though closely correlated. The former includes the study of the natural health hazards of occupational activities, the conduct of the necessary technical surveys to determine potential or existing exposures, and the laboratory analyses to evaluate these exposures. These observations and recommendations are made available to the safety officer who is responsible for the application of the necessary corrective measures.

In summary the functions of the medical officer for industrial hygiene are:

- a. To study the occupational health problem.
- b. To determine the toxicological data in terms of their effect on workers.
- c. To conduct surveys of potential health hazards in specific activities and processes.
- d. To collect samples in the field pertaining to occupational health exposures.
- e. To make laboratory analyses both on samples taken in the field and on any material submitted with reference to the causation of occupational disease.
- f. To prepare reports of findings, recommendations and conclusions evaluating the hazard of occupational health conditions.

3. Shore Establishments

The Navy Department Safety Engineer serves as adviser to the Director of the Division of Shore Establishments. This division is under the central administration of the Assistant Secretary of the Navy. The division develops the standards for safety protective equipment used by the navy stations and is responsible for the development of the general safety rules for shore establishments of the Navy. By frequent field surveys the Navy Department engineers, through the Director of the Division of Shore Establishments, serve in a technical advisory

capacity to the field in problems of safety engineering.

At each establishment a naval line officer, designated as the safety officer is responsible for the administration of the accident prevention program. He may be assisted by a junior line officer, a civilian assistant engineer, and one or more civilian safety inspectors. In general, one safety officer, engineer, or inspector is available for each 1,500 employees, which is in addition to shop safety inspectors assigned to specific shops.

The duties of the safety officer include: thorough inspections and general surveys of all mechanical conditions of the working places; the addition of necessary appliances for the protection of employees; and the investigation of all accidents in order to devise means for preventing a recurrence. All improvements come under his supervision. There must exist close coöperation between the safety officer and the Medical Department so as to correlate all phases of the safety problem.

THE INDUSTRIAL HEALTH PROGRAM

The object of the Navy's industrial health program is to protect the health, safety, earning power, and efficiency of the worker, and promote maximum production by minimizing the occurrence of occupational diseases, needless exposure to death or disabling injury, and absenteeism from whatever cause.

All prospective employees are given a complete physical examination by a member of the Navy Medical Corps to determine their physical condition and fitness for duty. The results of such examinations are of great value in proper placement so that the new employee will not constitute an accident risk to himself or others. Frequently correctible defects and incipient disease are discovered and the man is strongly encouraged to consult his family doctor for appropriate treatment. Following

the preemployment examination the prospective employee is told of the importance of reporting to the dispensary for proper care of all minor injuries and the ground work is started in regard to creating interest in safety.

All industrial employees in whom physical defects may endanger the health of themselves and/or others and who are subject to any occupational disease exposure, are given physical examinations at intervals sufficient to insure that necessary precautions are taken to maintain and improve their health and efficiency.

Operators of cranes, locomotives, engines, and other similar work, are given complete physical examinations yearly. Employees with an exposure to silica dust receive a chest x-ray every 6 months. Handlers of radium or radioactive luminous compounds receive a complete physical examination, including analysis of breath for radon, twice a year. Workers cutting or welding painted or coated materials and spraying lead pigmented paint receive a basophilic aggregation test quarterly where proper engineering control is considered in effect. The medical officer and the safety officer collaborate in determining sources of occupational disease exposure at each station, necessitating a periodical physical examination.

First aid boxes are not allowed in shops or offices because experience has shown that employees improperly take care of minor injuries and in many cases serious infection develops which results in loss of time and possible permanent disabilities. Every employee who is sick or injured must report to a first aid station, sub-dispensary, or main dispensary for treatment or advice.

A large factor of medical importance that affects the well-being and therefore the efficiency of workers is the relation of the worker to his environment. Because of the difficulty in obtaining certain strategic materials there is a con-

tinuous search for substitutes, and the Medical Department must stay on guard to anticipate and control possible hazards from new processes and new materials.

It is necessary that the medical officer know what potentially harmful substances, conditions, or forms of energy are being used, to what degree and the length of exposure in case of each individual or group before such harmful contaminants can be controlled.

Analyses to determine the presence and quantity of fumes, gases, and chemicals, and the sound application of hygiene, sanitation, and accident prevention, with periodical physical examinations are essential to the general plan of providing a safe and desirable working environment.

An industrial hygiene laboratory, adequately equipped is available at each of the Navy's principal industrial establishments, insuring facilities for the study of potential health hazards and for checking the effectiveness of existing control measures.

Other matters of paramount interest to the medical officer are: illumination, noise, fatigue, personal hygiene facilities, and the daily and weekly hours of work.

REPORTING OF OCCUPATIONAL DISABILITIES

It is obvious that adequate reporting and recording is required to keep industrial disabilities to the minimum and to serve as legal documents for the adjudication of compensation claims since the civil employee has both a moral and legal right to expect his government to maintain adequate permanent records to establish his right to compensation, and the tax payer has an equal right to permanent records to protect him against fraudulent claims for compensation against the government.

The Chief of the Bureau of Medicine and Surgery was directed by the Secre-

tary of the Navy to require a report of all accidents, injuries, and industrial illness occurring to Civil Service personnel employed by the Navy Department. This report covers both "lost-time" and "no-lost-time" injuries. In addition to sociological and medical data the basic reports serve to develop accident cause information. Close coördination and co-operation of the Medical Department with designated shop supervisors and safety officers is mandatory in order to attain accuracy of reporting. A responsibility of the shop supervisor is to furnish the accident cause information, thereby necessitating him to be familiar with the accidents occurring in his department. The original copy of each occupational disability report is mailed to the Bureau of Medicine and Surgery within, but not later than, 48 hours of the time of occurrence. In the Division of Preventive Medicine punch cards are cut from these reports and statistical analyses are prepared which serve as an index to control measures necessary.

From these analyses have come many advances in guarding machinery, protection against fumes from chemical processes necessary in the manufacture of munitions, control of the dust menace to health, etc.

CONCLUSION

The Navy's existing industrial hygiene program is paying dividends in decreasing lost time due to illness, decreasing the incidence of accidents, decreasing compensation payments, increasing production and efficiency, and promoting and maintaining morale of employees. It is recognized that there can be no relaxation of effort and to maintain efficient production there must be continuous active attention to prevent labor wastage.

The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

Industrial Hygiene Activities in the Public Health Service*

JAMES G. TOWNSEND, M.D., F.A.P.H.A.

*In Charge, Division of Industrial Hygiene, National Institute of Health,
U. S. Public Health Service, Bethesda, Md.*

INDUSTRIAL health is a "prime contractor" in this nation's war. Today when every disabled war worker means less planes, ships, tanks, and guns, the national industrial hygiene program assumes an A-1 priority rating. The program which was put into effect 18 months before Pearl Harbor has felt increasingly the impact of war. Basic activities have progressed smoothly and with gathering momentum. Recent developments, however, deserve special mention since they demonstrate a closer integration of industrial hygiene with the war effort. There has been, too, a growing recognition of the "essentiality" of industrial health protection on the part of war agencies and civilian groups.

The current program of industrial hygiene in the Public Health Service follows the lines recommended by the Subcommittee on Industrial Health and Medicine of the Committee on Health and Medical Care in 1940, but has been greatly expanded during the war months. The program includes recruitment and training of industrial hygiene personnel, research, aid to state and local industrial hygiene services, special services for the War Department, and a promotion of coördinated health and

medical services for the industrial population.

During the past year the number of trained professional personnel employed in federal, state, and local services has increased to 500. There are now 38 state industrial hygiene organizations, 1 county unit, 3 city units, and 2 district units covering a large city and several adjoining counties. The majority of the personnel now employed in these units has been recruited and trained by the Public Health Service and detailed to duty in state and local industrial hygiene units.

The activities of the governmental industrial hygiene units have increased greatly during the past ten months. The expansion of the war industries since Pearl Harbor has been phenomenal. The number of workers engaged in war production had doubled in September, 1942, at which time 15 million were employed in war industries as compared to 7 million in December, 1941. It is estimated that, by 1943, the total will be 17½ million. For the past two years, the work of governmental industrial hygiene services has been directed almost exclusively to the improvement of conditions in industries engaged in the production of war materials. Hence, the wartime increase in workers to be served has severely taxed the staffs and facilities of the existing units. Preliminary analysis of reports to the Division of Industrial Hygiene

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indicates that, in the fiscal year 1942, 32 state and local units reached some 5,000 establishments employing 2,400,000 workers.

In the immediate future and for the duration, the pressure upon the existing industrial hygiene facilities will obviously increase. The extent to which state and local units will be able to meet the demands depends very largely upon the ability of the Division of Industrial Hygiene to augment its funds and its program of recruitment, training, and assignment of professional personnel for war duty in these units.

Despite the fact that many staffs have been over-burdened, available industrial hygiene services have not yet been put to the maximum use. In many instances, serious problems have not been brought to the attention of state units. In other cases, units have not streamlined their procedure in order to speed up the correction of hazards in war industries. Time is the most "critical" material in total war. We should now give attention to ways of utilizing existing industrial hygiene services to the fullest degree and more efficiently. Certainly, there is ample opportunity to develop short-cuts in peacetime procedures, which will not lower essential standards of good industrial hygiene practice.

The Division of Industrial Hygiene also has been carrying on a coöperative program with the War Department for the protection of the health of workers in government-owned establishments. Approximately 150 have been certified to the division for thorough investigation. To accomplish this task, the division maintains mobile units, each consisting of 4 professional personnel, and the necessary supporting personnel at its laboratories. The mobile units have already completed surveys and made recommendations concerning the improvement of working conditions in 65 plants. Construction of many plants

is yet to be completed. If the Division of Industrial Hygiene is to speed further investigation and follow-up, it will be necessary to add more mobile units.

A committee to consider optimum hours of work has been formed by representatives of the Labor Department, the War and Navy Departments, the War Production Board, the Maritime Commission, the Department of Commerce, and the Public Health Service. After examining all available evidence, including studies made by experts and the practical experience of management and labor, the committee has made recommendations for the guidance of war contract plants as well as governmental establishments in establishing a schedule of hours of work best adapted to particular enterprises.

The Division of Industrial Hygiene is working with the Office of Civilian Defense to develop blackout procedures in factories and in effecting organization to deal with enemy attack on industrial centers.

A survey of the dispensaries and hygiene services in federal departments in Washington, D. C., was conducted by the division last spring. It was found that these dispensaries for the most part were established and administered by the departments and bureaus concerned, and that functions and activities varied widely. Of 85 dispensaries employing 155 nurses, not more than 20 were under the supervision of a physician. In no government agency was there found a comprehensive program of environmental and personal hygiene and preventive medicine such as is recommended for private industry. The over-all recommendations of the survey called for improvement in organization, personnel, utilization of space, and equipment in these dispensaries, with the provision that all should be operated under medical supervision. Since the completion of the survey, a number of fed-

eral agencies have adopted the recommendations and have sought the consultant assistance of the Public Health Service in the establishment of adequate industrial hygiene and medical services for federal employees.

In the field of research, much of the work of the Division of Industrial Hygiene is conducted for the Army and the Navy. The confidential nature of this work precludes reporting as to the specific projects and as to the results so far obtained. In general, however, these researches are concerned with numerous problems of aviation medicine and with the toxicology of explosives.

Investigation of occupational dermatoses has engaged much of the division's attention as a result of the use in war industries, of many new substances and processes. Intensive training of specialists in dermatology in occupational dermatoses was initiated during the past few months. A group of dermatologists from all parts of the country were invited to attend a brief training course at the National Institute of Health. These specialists have constituted themselves consultants on occupational dermatology in their communities, and their services are available upon request of industrial physicians in war industries.

Other new consultant services in the division have been established. Dr. S. J. Seeger, Chairman of the Council on Industrial Health of the American Medical Association, has been appointed consultant to the Division of Industrial Hygiene, for the purpose of securing closer coöperation between governmental industrial hygiene services and medical societies. A dental officer of the Public Health Service has been assigned to the division as dental consultant. He has been active in promoting the extension of dental services in industry through state and local health departments which already have dental hygiene programs. The objec-

tive is to include dental examinations in preemployment and periodic health examinations; to coördinate the work of state dental directors and industrial hygiene directors; and to set up demonstration dental services in selected plants.

At the request of several important industries, ventilation studies are under way for the control of benzol and other toxic solvents now being substituted in many industries for toluene. Safe utilization of these potentially dangerous substances will be increasingly required as toluene becomes less and less available.

Progress has been made in collecting and compiling data on medical service facilities in plants representing all types of industry and three size classifications.

The Division of Industrial Hygiene has been active in stimulating the x-ray examination for tuberculosis of the workers in many war areas. In co-operation with the Office of Tuberculosis Control of the States Relations Division of the Public Health Service and the various state industrial hygiene divisions, a study of several types of x-ray technics for the diagnosis of tuberculosis and silicosis has been made. Mobile 35 mm. photofluorographic units are operating in several areas at the present time.

The medical history of World War I shows that mortality rates for tuberculosis increased greatly during the war years and for some years thereafter, especially in Europe. Today, the massing of armed forces for training purposes and the concentration of families and industrial workers in defense and cantonment areas, often under unhygienic conditions, becomes a hazard in controlling the spread of tuberculosis. Unless national efforts are directed toward combating specific factors in the tuberculosis problem, we may well expect an upward trend in the tuberculosis mortality curve for the

United States. Such an upward trend has already taken place in England.

The armed forces have already undertaken the examination of all enlisted men entering the Services. The next specific undertaking should be the examination of all industrial employees and an annual follow-up in certain groups.

The nation-wide survey of the duties of nurses in industry undertaken by the American Public Health Association in coöperation with the National Institute of Health has been completed. A preliminary report will be presented to this conference. The professions as well as administrators and health agencies will benefit greatly by the findings of the survey which has covered approximately one-third of the nation's industrial nursing force.

The Division of Industrial Hygiene has been active in the preparation and dissemination of information for professional personnel, for management and labor, and for individual workers. Reports of scientific investigations and statistical studies have been published and distributed widely. A monthly news letter reaches nearly 1,000 industrial hygienists.

In addition an outline of an industrial hygiene program in individual plants has been prepared and made available to labor-management committees of war production plants and other interested groups. This outline was prepared in skeleton form and mimeographed. It met with an unexpectedly large demand, some 5,000 copies have been distributed, and requests for several thousand more have come in.

A manual on engineering control of environmental hazards and a manual on medical service in industry have been prepared, both of which have been incorporated in the loose-leaf safety manual issued by the Plant Security Division of the Office of Ordnance, U. S. War Department.

A plan for preparation of a handbook for physicians on industrial hygiene has been approved by the Federal Security Administrator and the Surgeon General. The manual is being prepared by the professional staff of the Division of Industrial Hygiene under the editorship of Dr. Gafafer, and will discuss the outstanding problems of health conservation in the war industries.

Considerable progress has been made on an annotated bibliography on industrial psychiatry to be compiled under the joint sponsorship of the Health and Medical Committee, the National Research Council, and the National Institute of Health. It will be issued in a series of six or more bulletins. The title selected is "Mental and Emotional Hazards in Industry—A Field Bibliography for Industrial Psychiatry."

Two other publications are in production at present—the first an illustrated pamphlet interpreting to management, labor unions, and other interested groups the usual services of a state or local industrial hygiene unit, and the second an illustrated catalogue of industrial hygiene educational materials available from the Public Health Service.

To inform the professional groups further, throughout the country, governmental industrial hygiene services, state medical societies, and educational institutions have sponsored institutes for private physicians, nurses, and other professional groups. The Division of Industrial Hygiene has participated in many of these intensive training programs and will continue to do so.

I have briefly summarized activities now going forward in the combined effort of the civilian authorities for industrial health. Much still remains to be done. As I see it, the problem is not so much what to do but how to do it.

Since the development of industrial

health service is a relatively new field in public health, it is important that the objectives, functions, and achievements of industrial hygiene be interpreted to management, labor, and to the individual worker. The promotional program should be strengthened and extended to recruit the support not only of the professions, but also of the particular groups whom modern industrial hygiene would serve.

The problem of medical care for workers and their families is one of vital importance. Reports to the U. S. Public Health Service indicate that in many communities there are not available sufficient medical, dental, and nursing personnel, or hospital facilities, for the medical care of workers and their families. This problem arises not only from the rapid development of industries in the sparsely populated areas, but also from the shortage of professional personnel as the result of supplying the needs of the Army and Navy.

Nine in every 10 industrial absences because of disability are the result of diseases and accidents incurred off the job. A few progressive employers and unions have developed comprehensive medical services for workers and their families. On the whole, however, plant medical services and union health programs have not broadened their scope to include general medical care. In hard-pressed industrial communities, where no other facilities are available, industrial medical services should be extended to general medical care both for employees and their families. Since the shortage of physicians available for full-time industrial service impedes the expansion of in-plant programs, the practising physicians of war communities should be utilized to the utmost by industry. In fact, the industrial medical service, whether rendered by full-time professional personnel or not, should be closely coördinated with all

the public health, hospital, and medical facilities of the community.

If existing industrial medical services are strengthened and retained, approximately one-third of our workers will have available such services in their plants. The remaining two-thirds of our workers who are employed in small plants of less than 500 are at present virtually without needed industrial or medical health service. Appropriate action should be taken to meet these needs, and compulsion used if necessary to secure medical service in war contract plants. The British experience indicates that this can be done, given a proper assignment of medical personnel and a national policy.

The existing standards for employment of handicapped workers should be reviewed and adjusted to present needs. Among the several million handicapped persons in the United States there are many thousands who should be employed in war plants. The Division of Industrial Hygiene has joined with the U. S. Employment Service in a series of conferences to consider the employment of physically handicapped persons in the war industries. The policy recommended to the War Manpower Commission would require the employment of many thousands of persons with minor or major disabilities and would make the pre-employment physical examination an effective tool for the proper placement of all workers.

One of our major problems is that of community resources. Despite the expansion of public health services, many industrial communities are still providing meager public health, medical, and hospital services. The problem is especially acute in communities where large war plants have been constructed almost overnight and where tens of thousands of industrial workers have taken residence. Problems of over-

crowding, lack of sanitary facilities, and communicable disease control have arisen. The provision of adequate sanitary and public health services is primarily a local problem. Nevertheless, when local inertia retards the war effort, state and federal agencies have a clear responsibility to act.

It is an old public health maxim to strike hard where you can do the most good—that is, to center activities where the burdens of disability and premature death are heaviest and the opportunities for health conservation are greatest. Today, in this nation at war, the focal point is the industrial population—the men and women engaged directly or indirectly in producing or transporting the things we need to win.

For the past 25 years, study after study has been made and consistently demonstrated the fact that death and disability rates are higher among the industrial population than among any

other employed groups. During the same period, industrial hygiene, modern medicine, and the generalized public health program have proved beyond the shadow of a doubt that an astonishing proportion of this human waste can be prevented, at less cost than that of continued neglect.

At this critical time in our nation's history, it is imperative that all of us—individually and collectively—put that knowledge to the proof. The governmental industrial hygiene services—federal, state and local—are ready and willing to bring to bear upon the health problems of workers the full force of their preventive programs. It remains for them to redouble their efforts, both to extend the preventive program and to recruit the support of all available resources for adequate health care of America's workers upon whom—shoulder to shoulder with the armed forces—rests our fate and that of our children.

Unexpected Occupational Disease Exposures During Wartime*

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THE subject assigned provides an opportunity to discuss what we think is the proper attitude of industry toward the health, safety, and comfort of its workers. In the Chrysler Corporation we hold firmly to the conviction that healthy workers are a valuable aid to production. We believe that the health of employees can and should be conserved, and that industrial health hazards can be anticipated and remedial measures prepared before practical exposure occurs.

Therefore, a complete industrial health program contemplates not only the treatment of disease but also the prevention of disease, and, since the prevention of disease requires the recognition of new hazards before they become operative, it may be open to question whether any occupational diseases should be unexpected. There are a number of materials which are new to industry and there are a larger number which have new applications. We presume that all of the elements have been discovered and a small amount is known about all of them. However, some of the rarer substances such as indium, gallium and osmium are now coming into wider use due to priority restrictions on older and more common materials. Also, some new organic com-

pounds are in use and possibly other new organic compounds will be introduced from time to time. By far the larger category consists of materials which have been known for a long time but which are now employed in new ways, although many old materials are new and unfamiliar to some industries.

GENERAL PAPER

In the following interesting cases which have come to our attention, it should be understood that we do not have the ideal solutions for every one of the problems found.

In the past, benzene has been restricted within the Chrysler Corporation so that we have had none of this material in our plants. Recently benzene was found in a new operation involving the polishing of reflectors where it was used as a flotation agent for the polishing material. Production people in charge, never having had any experience with benzene, were surprised to know that it was a toxic substance. A few trial runs indicated that a solvent naphtha, such as a hydrogenated naphtha, would take care of this problem satisfactorily. Because the hydrogenated naphthas are only slightly toxic, any possibility of major hazard is removed from this operation by its use. Since this problem has arisen, members of the Industrial Hygiene Division of the Medical Department have been able to make other suggestions which

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materially improve the polishing properties of the compound used. This exemplifies the production gains which may be brought about through the investigation of hazardous materials.

Another compound which was not previously used by our Corporation, except for fire fighting fluids, is carbon tetrachloride. This material had been needed for a great number of purposes in the past but substitutes have been provided which are satisfactory in every way. Recently a survey of one of our gun plants indicated that a fairly large quantity of carbon tetrachloride was being employed on one operation. Investigation showed that a certain critical tapping and machining operation was using up to 25 per cent carbon tetrachloride along with a cutting compound in order to provide a technically satisfactory product within the very close tolerances demanded by the inspectors. Numerous cutting compounds had been tried and none had proved to be satisfactory. Tests on the operation showed that this condition was very unsatisfactory from the health standpoint in that serious illness might result among the workmen if corrections were not made. However, this work was so essential that, had a change been made in the operation, without a satisfactory substitute being provided, it is highly possible that the production operation would have ceased. Since this was undesirable, it was then suggested that small percentages of trichlorethylene might work satisfactorily from a technical standpoint. Test trials revealed that very small percentages of trichlorethylene would do as good a job as larger percentages of the more dangerous carbon tetrachloride. The operation is now using a maximum of 8 per cent trichlorethylene, and better production results are being obtained than when carbon tetrachloride in larger percentages was being used. The tests made with the interferometer

have shown concentrations which should cause no concern.

Certain other suggestions have been made relative to substitutes which will relieve all toxicity fears, should these substitutes prove to be technically good compounds. However, trichlorethylene is a satisfactory technical product and, since the toxic concentrations do not exceed 120 p.p.m., at any time and under any condition, it is doubtful whether further tests to introduce new substitutes will be useful. Trichlorethylene has shown some interesting properties in connection with cutting compounds and may prove to be valuable on other jobs.

The above mentioned materials certainly are not new and they probably would not be interesting except that the applications were not common and certainly were unusual to us. They are examples of old materials becoming important through new uses.

Lead tetraethyl, a compound which is used to increase the octane rating of motor fuel, is an example of a well known material which again is coming into more prominence due to the war requirements for higher octane aviation gasoline. Whereas in the past we had been accustomed to using a white gasoline with no lead in it and had received satisfactory performance because the octane rating of this white gasoline was sufficiently high to be technically satisfactory, we now find lead tetraethyl being used not only in the higher aviation grade gasoline but also in the lower grades of gasoline. This comes about because the various white gasolines are being "bumped up" to higher octane ratings. Thus the gasoline which you are buying at the corner gas station is now composed of a gasoline which has a much lower octane rating and additional amounts of lead tetraethyl. Indeed, some gasolines which previously have advertised their non-lead content now contain lead tetraethyl.

This becomes important because these gasolines are used throughout the plants for various washing purposes. Men get their hands, and sometimes other portions of their body, in it and lead absorption through the skin must receive our consideration. In this particular case, the correctional efforts involved an educational campaign among the workers and a change in our specifications. First, warning signs and placards were placed at all points where gasoline was dispensed for any purpose, which stated among other things that this leaded gasoline should not be used for any purpose other than for motor fuel. Suitable mineral spirit, mineral seal oil, or various grades of naphtha were then specified and used for all washing and cleaning purposes. In a few instances, other measures such as the installation of automatic degreasers or alkali washers were necessary.

A control problem is, however, introduced into those plants which are in multi-story buildings due to the fact that concentrations of lead higher than the maximum allowable may be introduced on elevators and in other inadequately ventilated closed spaces where jitney trucks and other motors may be running. These areas must be tested periodically. Other areas where high leaded gasolines are known to be used in tanks, airplane motors, and trucks must be studied to determine what additional control measures, such as increased ventilation, will be needed. Indeed, in some places, increased specific and general ventilation has already been provided.

Another example of an entirely new hazard is now mentioned. Several cases of dermatitis and conjunctivitis have been found in a new secret adhesive operation. It has been ascertained that the cement is the causative factor. However, due to the secret nature of the process and material, it is difficult to get accurate information on

all its components, and such information will have to be determined in the laboratory. Patch testing will be utilized to ascertain whether or not certain components in question are the source of the dermatitis and suggestions for possible substitutes will then be made. This may involve new organic materials or old ones which have not been previously studied. It is probable that substances which have not been fully investigated from the toxicity standpoint will be encountered in this particular instance.

It may be interesting to mention now a group of instances relating to dermatitis which have been of interest to us recently. In one case, a canvas tarpaulin material received from one company was used and no difficulty noted. However, the same material, with presumably the identical type of resin and dye impregnation, supplied by a different vendor, gave cause for complaint. Workmen got dye and resin into their skin and a very mild dermatitis resulted. In addition it was almost impossible for the employees to wash the dye from their hands and arms. Investigation revealed that the company supplying the material complained of indicated that the difficulty arose from the combination of the dye and the resin in the tarpaulin. Further, wartime needs caused the material to be shipped as soon as it was manufactured, with no proper period of time for aging. In addition, a new solvent was being used due to priority restrictions on the solvent which had previously been approved. In this case, inquiry directed to the company resulted in an admission that the above was true and that other similar inquiries had been received from a midwestern state health department. The material which was being received by our Corporation in a tacky wet state was immediately improved and new formula for the treatment of the canvas cloth was put into use by this company causing it to be entirely satisfactory.

Another situation in which a number of women were complaining of itching but of no severe dermatitis was found in a wiring department on airplane parts. Here the resin used in the wire coating did have some irritant properties though not enough irritation resulted to cause skin lesions. Chemical tests indicated the presence of cresol-like compounds. The skin might become slightly irritated but the main damage came from the scratching which resulted from the irritation. Because of this, the companies concerned in supplying this material were asked to deliver their products in a dryer and less tacky state. It was found that the resins which were used in the coating were not dried out sufficiently and the residual vapors were sufficient to cause irritation. Very definite relief was provided for the persons concerned by washing their bodies with sodium bicarbonate solution.

Another group of men working on bronze gun parts complained of an itching sensation and presented eczematous skin lesions. These lesions we have called "bronze itch" which is characteristically very much like what is listed in the literature as "copper itch." The condition predominated about the neck line, belt line, legs, ankles, and wrists, which indicated very definitely that it was a mechanical irritation. Patch and chemical tests were performed which bore out this conclusion. The remedy in this case consisted of personal cleanliness. A program of personal hygiene instituted immediately brought very great relief and this was supplemented by the introduction of a personal protective coating. Since these measures were taken, no further complaints have been received.

Another case analogous to this but having much more interesting possibilities was found in the airplane body work where aluminum chips and dust were getting into the men's clothes and over all parts of the body. The lesions

caused were apparently of two types but both were signified by the resultant pigmentation of the skin which lasted for a considerable period of time. It is possible that this pigmentation may result from the small percentage of magnesium which is found in this aluminum alloy. There is, however, the complication that this may be effected by irritants in the electrical wiring coatings mentioned before. In this instance, the maximum number of cases, as was the case with the "bronze itch," arose during warm weather. A program of personal hygiene immediately eliminated most of these cases but a few persisted which were characterized by an itching sensation and small hard papules which, on healing, were pigmented for a considerable period of time.

An entirely different kind of exposure has developed with the increase of horse power of airplane motors. While the testing of motors has always been a noisy operation, these operations had in the past been kept to a 90 decibel level or lower. However, the advent of engines of from 1,500 to 2,000 h. p. and upward has resulted in test rooms having noise levels of from 120 to a peak of 140 decibels even though scientific methods of sound-deadening rooms have been followed. In one instance, a test room having a noise level of 118 to 120 decibels had the control chamber, where all the operators are located, in a separate acoustically treated room, but even in this room the noise level was approximately 90 decibels. A suggested solution was the installation of sound-deadening baffles about the pipes and motor on a hinged arrangement so that ready access could be had to all parts of the equipment. Such devices can result in a lowering of the noise level from 12 to 20 decibels. Such reductions do not appear to be large but, when the very high level of sound is considered, this is a worth while reduction particularly when the nature of the scale used in deter-

mining the decibels is considered. A reduction of 2 decibels in these high ranges means the cutting of the volume of sound in half. Whereas a few years ago a noise level of 110 to 115 decibels was considered about the top, we are now faced with routine noise levels which are considerably higher. Somewhere around 125 decibels the problem becomes more involved than simply the loss of hearing. In fact, the hearing may be safeguarded through the use of personal protective devices but little is known concerning the vibrational effects on other parts of the human organisms at these higher levels of sound. All the men exposed to high levels of sound are now given special physical examinations which include, in addition to audiometer tests, complete clinical laboratory tests, basal metabolism, and electrocardiography. Close control maintained at frequent intervals on the individuals concerned should lead to the detection of injury before any becomes serious.

While the noise problem is not new, it was not fully anticipated that the noise levels would reach those mentioned above but, in view of the attempts to make louder and louder sounds for air raid sirens, it may be expected that still higher levels of sound will be found in special instances, and these higher levels presumably could cause some systemic damage unless guarded against. This, as far as we can see, will open an entirely new field of research in a field that is very old.

The mere increase in plant facility has introduced additional problems in all parts of the country. While new sanitation and housing loads have had recognition from the appropriate public health agencies, there have been problems introduced into the plants themselves.

Thus, when one new plant was built for government use by our Corporation, wells had to be drilled, the resultant water tested, and sanitary facilities provided. It so happened that the water

contained such large amounts of methane that, when a match was applied to a milk bottle full of freshly drawn water, the gases bubbling from the water would ignite and a blue flame would be maintained on top of the water for almost a minute. This gaseous content led to various explosive possibilities which were not wholly solved until a new source of water supply was brought into the plant. The appearance of this amount of gas also indicated the need for very thorough chemical and bacteriological examination of the water supply. In addition to the water supply, a small sewage treatment plant had to be provided. This plant, though modern in every respect, did give off some slight objectionable odors but this was not important as it was located a considerable distance from any plant activity. Recent plant expansions have brought the plant operations right to the doors of this sewage disposal unit, and some complaints have been made. This has resulted in the installation of a ventilation system over the exits to the sludge pits so that all odors were removed.

Probably the most unexpected occupational disease exposures have arisen as the result of the stringencies of the raw materials used in the war effort. In a War Production Board release of August 24, 1942, the following materials were listed in Class III as available in significant quantities as substitutes for scarcer materials: ferroboron, ferromanganese, gold, indium, lead, osmium, palladium, and sodium. When the large number of metals available are considered, this very small list, which includes a large proportion of formerly rare and expensive elements, is indeed unexpected. Of these elements and compounds, something is known concerning gold, lead, and sodium; a little less is known of ferroboron, ferromanganese and palladium; and very little is known concerning the acute and chronic toxic-

ties of indium and osmium. Some investigations have been instituted on indium within the Chrysler Medical Department. Reports will be made as phases of the investigation are completed. These substances and compounds mentioned above are important in view of the fact that these are the materials that the authorized agencies state are available for substitution. Already in-

dium is used in the surface treating of airplane engine bearings, and a considerable number of other uses are projected.

The determination of the hazards which might result from the use of these materials in numerous new applications assumes great importance in order that the health of the working population may be fully protected.



Impact of War on Children and Youth— Intensification of Emotional Problems*

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THE nations of the world that recognize and protect rights of the individual have been deeply concerned about the relationship between war and juvenile delinquency, not only since this war began but during and after the first world war. This concern is indicative of the present-day constructive attitude toward delinquency in children—namely, that the delinquent child is a sick child.

If I may extend this concept I would describe juvenile delinquency as a symptom of nutritional deficiency, a deficiency in the child's spiritual nutrition resulting in a stunting of ideals and a crippling of character, so that the child cannot administer his behavior to conform to the standards of the community.

Scientific observation suggests that the ability of a person to direct his behavior into satisfying and acceptable channels is dependent upon a complicated balance between gratification and renunciation.

Let us briefly view the mechanics of this. The child's first gratifications and restrictions are controlled by the parents, chiefly the mother at first. Later, the father, and then others in the family, school, and community become involved in this give and take of human relationship with the child. With growth come new and different gratifications and re-

quired renunciations, but none of these ever assume the basic importance of those that belong to the family. The child must in early months accept many restrictions and deprivations. He must be taught to accept conformity which requires renunciation of doing what he pleases, when, where, and to whom. He can accept this personal sacrifice and discipline only when he is assured of parental love in its place. He gradually accepts as his own the moral concepts that are taught him by the parent whom he loves. This is as it should be.

But why is the delinquent child different? In the majority of instances he is different because he has different feelings—he has not learned to love and admire anyone sufficiently to deny himself certain pleasures for the purpose of winning their love and approval. He sees himself as unloved and unaccepted by one or both parents. Any additional deprivation imposed by the limitations of family, community or state reinforce his feeling of unjust discrimination. Lacking an acceptable, strong, emotional tie which would form a basis for personification of ethical concepts, he develops a distorted conscience and weakened powers of resistance. All this makes him susceptible to any stimulating adventure within his reach that offers escape from the hurt of loss of love and pride. In return for security and adequacy within the family he attempts to settle for the security of the gang, the

* Presented at a session of the U. S. Children's Bureau, Commission on Children in Wartime, at the White House, Washington, D. C., February 4, 1943.

thrill of independence, and denial of dependence. His total behavior may be considered an expression of protest against keenly felt deprivation.

If we are to consider intelligently the problem of juvenile delinquency, whether in time of peace or war, we must examine the way in which the fundamental needs of all children are met, and must accept the importance of the fact that what needs are not met by the family unit must be met by the larger family—society. Let us see what happens to the child's fundamental needs in wartime.

Will he as an infant and small child get less mothering and less fathering in wartime with all that is involved in affectional relationship, physical care, personality development, and moral guidance? Will he be robbed of even the security of familiar surroundings because his family migrates? The small child robbed of the spiritual values of home is surrounded on all sides by the permissiveness of violence at an age when he needs so much mature help in controlling his own destructive drives. The young child is normally aggressive and destructive. Education in our culture is concerned with directing this drive into constructive channels. With war and his identification with warriors, the inhibition and sublimation of destructive drives becomes more difficult for him. The child will not receive the same assurance from the adult in wartime that killing and mass violence is wrong and that problems can be solved in other ways. For all these reasons young children need mothering more than ever before. They also need the presence of a father or father person, around whom to build their ideal of a good man.

School children need vastly more personal security and guidance. The school must feel greater responsibility for the child's life over and beyond the narrow limitations of a standard curriculum.

Curricula should be geared to modern living, with emphasis upon social studies and individual responsibility in community, state, and world affairs. Children today are seriously handicapped in their opportunity to believe in the inherent goodness of man and must be helped to understand the experiences that engender love and hate in all men. The church can contribute immeasurably to morale and character building for all children, providing the church, like other institutions, secures personnel of the stature for such responsibility. Ideals are molded by the patterns of personalities we admire. The child cannot build an ideal for himself unless he has the semblance of that pattern in the home, school, community, or church.

The adolescent with his approaching intellectual maturity but characteristic emotional instability reacts more noticeably to war than does the younger child. His basic personality and character potentialities are in a process of flux and are experiencing added physiological pressures. Most of his attitudes and behavior trends are well formed by now, but a testing out is required before final decisions are made and before a philosophy of life becomes more or less crystallized. War is contrary to all he has believed in or planned for. He does not have as yet the mature resignation to tolerate too much frustration, and war presents so many renunciations over and above the possibilities for gratification. Now at a time when he is struggling for mastery over his body and soul, he is bombarded with the haunting insistence to live—live fully and dangerously if necessary, for tomorrow may be too late. The physiological functioning of the adolescent demands activity. Inactivity bores him and creates internal tension which must find release. He is likely to resent the authority of any who would deny him freedom. The conflict between dependence upon the family and independence

normally reaches acute intensity at this period. With war challenging the productive abilities of all, most young adolescents are impatient to prove their personal worth. They want to work, whether in a war activity or at part-time work nonessential to the war. This is in part their protest against society considering them as children. The sudden assumption of mature responsibilities and privileges without the experience and training belonging to maturity can place young people in a social situation fraught with many dangers.

Yes, children of all ages will be subjected during the war to more of the experiences that make for delinquency than ever before. War intensifies many times the normal needs of all children. Does it not logically follow that whatever we do for the welfare of all children will be reflected in a lower incidence of delinquency? We trust that the majority of older children of today will be immune to the destructive influence and increased opportunities for delinquency growing out of war. But what of those children who are unstable—whose earlier experience has been lacking in character-building essentials? Just as the malnourished child has greater susceptibility to acute and chronic infections, so the neglected, unloved, and untaught child has less resistance to the forces that endanger character. This is the child who will become delinquent with the increased opportunity and who should receive special consideration. No community

can ever completely make up to these children for their early deprivations. Few communities will be able to do more than partially meet their accumulated and intensified needs. Facing the prognostic limitations growing out of the very nature of character formation and the nonavailability of skills for use in redirecting character trends, we should immediately focus our attention upon the safeguards and protection that the community can offer the youth who has not internalized the required restrictions in his own concept of behavior.

Protection needs to be particularly strengthened in the areas in which young people work and play. Experience should advise us that youthful discontents are selective in the activities they choose for expressing their unsatisfied hopes and desires. If we attempt to substitute one type of activity for another we should be guided by the interests and background of the particular group to be served.

The importance of leadership—dynamic leadership—acceptable to adventurous youth cannot be overstressed. Adolescent boys must have male leadership.

In conclusion, I want to express the belief that we are justified in our concern about juvenile delinquency. I say this not only in the interest of those boys and girls who will become delinquent during this war, but in behalf of all those who are now children and who will carry the responsibility of world peace and brotherhood into the future.

Trends in Laboratory Procedures in the Milk Control Program of St. Louis*

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ST. LOUIS, while operating under the standard milk ordinance, presents a special problem to the laboratory on account of two facts: the number of producers is relatively enormous (e.g., 20 times as many as those supplying San Francisco, of roughly the same population); and all milk marketed is pasteurized. The reasons for these facts are historical. The early city officials concentrated on moving the producers, as public nuisances, outside the city limits and then found themselves unable to claim any control over them. As the number of one and two cow producers among the neighboring farms and the size of the milkshed increased, pasteurization became an economic necessity to the city processing plants, especially in the hot season. While the number of shippers has declined in recent years, it is still over 4,000.

The peculiarities of the local situation have naturally colored the viewpoint of the laboratory. In addition to the routine problems, we are especially interested in discussing methods for examining large numbers of raw milks and for the phosphatase test.

The large number of producers is an excellent argument for the use of the simplest laboratory control procedures

authorized for individual shipper samples, but we are convinced that the methylene blue reductase test is the most valuable single test for such samples. Various workers have attempted to increase the refinement of this test by technical changes which increased its reproducibility (with regard to duplicating results on identical samples), but markedly altered the numerical values obtained.¹ Thornton² has pointed out that, without an absolute standard by which we can evaluate true accuracy, we should hesitate to sacrifice either the convenience or the significance, based on years of accumulated experience, of the old and simple version. Obviously, one sure way to increase the ability of the test to reflect fairly the quality of a given supply is to examine a larger number of samples from each source; and by working rather to simplify than to complicate technic, we can increase the number of samples that can be tested in a given period with a given laboratory staff. With this object we have adopted the following simplified procedure, which in no way changes the essentials of the present standard test³:

The samples arrive in the laboratory packed in ice water, and are left there until a large number, or the bulk of those expected, have come in; but we keep as far as possible within the statutory 2 hours. A pipetting machine, such as is used in serological labora-

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 30, 1942.

tories, is filled with methylene blue solution after rinsing with chlorine solution, hot tap water, and sterile distilled water. The stoppers are removed from the tubes and the dye pipetted into the milk. The tubes, which are in racks holding 10, are stoppered with a strip of smooth-surfaced sponge rubber, long enough to cover the rack, held in a metal gripper. This is held so tightly against the mouths of the tubes that they may be inverted and shaken vigorously without leakage. As one rubber grid is used for shaking, an assistant rinses a second in running tap water and blots it with a fresh paper towel. The tubes are checked with their log and placed in a large water bath without further delay. The incubation and reading are conducted as usual.

In this fashion, two people can set up 1,500 or more tests in about an hour; the schedule works out so that the time spent in checking the tests into the bath is the same as the time taken for reading, so incubation periods can be exactly measured. The labor is virtually reduced to preparing the outfits for collection, taking the samples, and reading. The only deviations from the Standard Methods procedure³ are thus:

Use of pipetting machine—This is calibrated to deliver far more accurately than can the human worker under pressure. The cleaning process is so effectual that the dye as pipetted contains less than 1 bacterium per ml.

Leaving samples uncovered during incubation—Since they are kept in a covered water bath, air contamination is insignificant. Diffusion of oxygen into the milk is known to be too slow under these conditions for the absence of a stopper to have any effect on the reduction time. The rubber strip adds few or no organisms.

Mixing of the tubes at room temperature instead of at 37° C.—This permits the schedule to be maintained and,

since the tubes are warmed very shortly after mixing, should not affect the creaming.³

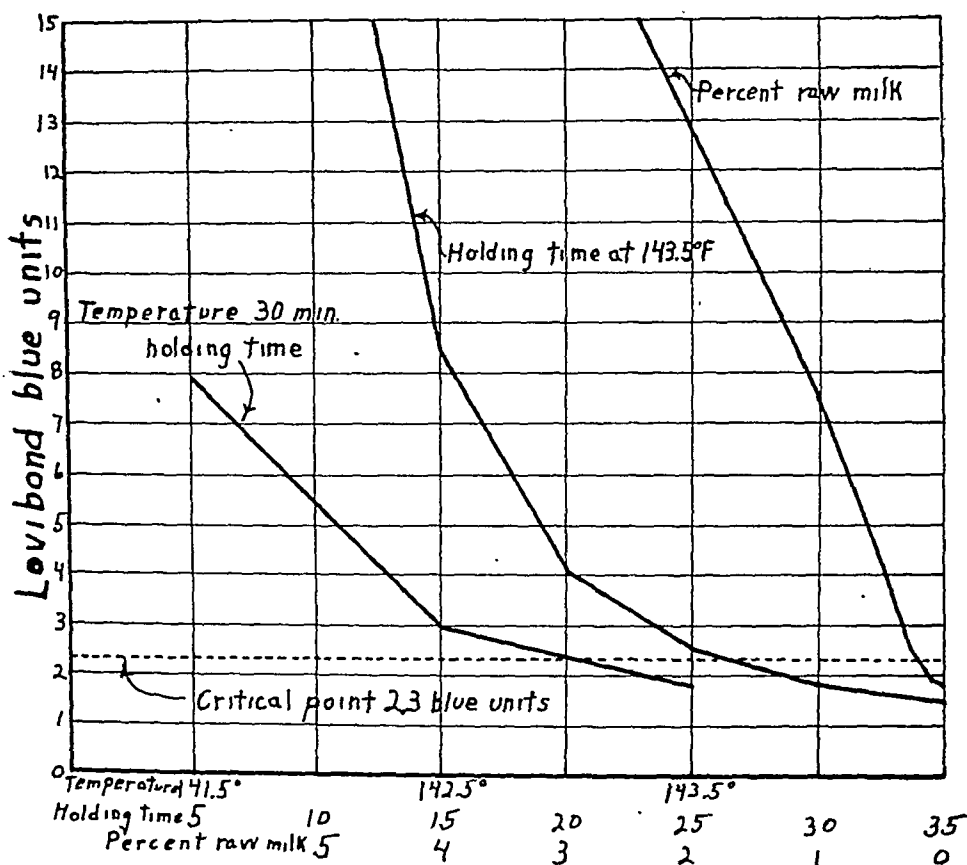
Some 40,000 samples are tested each year. Improvement in quality of the unprocessed milk is shown by the fact that only half as many samples are now reduced in less than 6 hours as in 1938.

As the methylene blue test has become our mainstay for testing raw milk, so has the phosphatase test for pasteurized milk. Extensive studies conducted here in 1937 showed that the Schärer⁴ field test (which did not then include solvent-extraction), with 1 hour incubation, and the original quantitative Kay-Graham,⁵ with 17 hour incubation, were equally sensitive in detecting experimental underpasteurization (as defined by local ordinance), or contamination with raw milk. After several months in which both were used, the short test was adopted as an exclusion test, and the Kay-Graham method retained only as a check on positive samples. Now all pasteurized products submitted for plate count are tested, the sample for the phosphatase test being pipetted immediately after that for the plate count, with the same pipette. Positive or suspicious samples are repeated in duplicate, with the prescribed controls, by the quantitative Kay-Graham method, and the results are reported in Lovibond blue units. The Milk Control Section, which receives the reports, has been supplied with a graph, based on the results of the experimental studies, on which blue units are plotted against holding time, temperature, and raw milk content (Figure 1). The section reports that it finds this graph very useful in tracing the source of violations.

In the last 5 years we have run 4,000 to 6,000 phosphatase tests a year. The percentage of positive reactions has dropped from 2.2 for milk and 4.3 for cream, to 0.3 and 0.8 respectively. Frankly raw milks are virtually not seen. It is obvious that even before the

FIGURE 1
PHOSPHATASE TEST

Correlation of underpasteurization and percentage raw milk in terms of Lovibond blue units using our modified test



introduction of the test, a remarkably good job of pasteurization was being done by the industry; now it is close to perfect.

Because of the requirements of the ordinance, we continue to make thousands of plate counts. We have only one or two comments on technic: we incubate plates only at 37° C., since 32° incubation in this climate would be expensive for the small dairy laboratories. We have modified the rules^{3,6} for counting plates to this extent: when our routine dilutions of 1:100 and 1:1,000 fail to produce plates within the 30-300 range, counts are reported literally as found, on the argument that below 30 the error is in the direction of making the count too high, and to report the

result merely as under 3,000 has the force of making it still higher; and conversely, when the 1:1,000 plate is over 300, the error tends to make the count appear lower than the actual, so less injustice is done by giving the found value than by reducing it to the blanket minimum of 300,000. As the counts are to be averaged with others, this seems the fairest procedure.

We have been subjected to an increasing demand for miscellaneous services beyond the strictly sanitary and nutritive control of milk; determinations of curd tension and efficiency of homogenization, diagnosis of mastitis, detection of plant contamination with thermophilic, thermoduric, and ropy-milk organisms, even surveys of local dairy

laboratories as to compliance with Standard Methods. Perhaps it should be pointed out that the laboratory service operates as an independent unit of the health division, not as a milk laboratory *per se*, and is able to exercise a certain amount of discretion as to function, attempting to stay rather strictly within the public health aspects of the job (we have for example decided that it is not our province to trace producers contributing thermophilic or thermoduric organisms; and we test for mastitis only with reluctance). We are consequently interested in the policies of other health department laboratories and welcome this opportunity to acquire information, in the meantime relying for our clues on the emphasis in the manual of Standard Methods.

To summarize, our situation is this: the milk supply comes from frequently tested sources and is entirely pasteurized; there is an efficient inspection service, especially as to post-pasteurization processes; a virtually tamper-proof bottle closure is required; and in the phosphatase test we have an excellent laboratory check on pasteurization. We feel that where this situation exists, a shift in emphasis in laboratory control should be very seriously considered. It is probably generally agreed among

laboratory workers that bacterial counts (by whatever method) contribute little or nothing to controlling such a supply, and indeed at times actually detract from the control because of the logical absurdities encountered in the attempt to enforce bacterial standards. This is not to belittle the evolutionary or educational value of the procedure, but to emphasize its fundamental inappropriateness in the situation described. Rice⁷ has already voiced our obligation to reexamine critically such procedures with the object of eliminating what have become, with the passage of time, irrelevancies.

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Prognosis in White and Colored Tuberculous Children According to Initial Chest X-ray Findings*

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THIS paper is concerned with the extent of chest lesion demonstrated at initial x-ray examination in a group of 1,148 tuberculous children whose infection was discovered prior to 15 years of age, and who have been followed for varying periods of time in a study of their mortality from tuberculosis. The data were taken from an outpatient clinic for tuberculous children conducted at the Johns Hopkins Hospital since 1928. This clinic admits tuberculin-positive infants under 2 years of age and keeps them under observation as long as possible. It also arranges for the examination of parents and older siblings in the appropriate public dispensaries of the same hospital, and thus maintains a family record which it attempts to keep up-to-date both for morbidity and mortality from tuberculosis. The records for analysis include those of infected children admitted to the special clinic during infancy, and also those of infected older siblings examined in the general pediatric dispensary. Infection was determined in the children of these families by their reaction to intradermal testing with old

tuberculin. All their x-rays have been reviewed by the author.

The races are somewhat unequally represented, there being 404 white and 744 colored children in the study. In both races about 60 per cent of the children whose records were analyzed were under 5 years of age at the time infection was discovered; something less than 30 per cent fell into the age group 5 to 9, and not much over 10 per cent fell into the age group 10 to 14. This concentration in the younger age groups is a reflection of the requirement that all the families followed must contain an infant under 2 years of age, eligible for care in the special clinic. There was no evidence of sex selection.

Roughly, one-fifth of the children of this study were brought to the dispensary because of some complaint, and tuberculous infection or disease came to light in the course of a complete examination which included the tuberculin test. The remaining four-fifths were examined only because of known tuberculosis in the family, usually an open case in an adult. Verification of household contact with open tuberculosis was somewhat less frequent for infected colored infants than for white children of the same age, and exposure from the community at large appeared to account for infection in a somewhat larger proportion of Negro infants. So far as *duration* of household contact could be estimated, colored children of this study

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had less exposure than white children; but this does not dispose of the possibility that colored children when in contact may have been more intensely exposed.

For both races the families studied belonged to economic groups unable to pay for medical care; and for the period of observation covered by this report the great majority were supported by public relief. Homes were overcrowded and far from ideal for both races; and while the average Negro families probably lived under even poorer conditions than the average white families, at this economic level the differences in environment were not striking.

The great majority of these children had only dispensary supervision during the most active phase of their tuberculous infection. This was especially true for children found infected before 6 years of age for whom the State of Maryland had made no routine provision in state sanatoria during the period covered by the study. A small number of white infants could be accommodated without expense at a private sanatorium; and both white and colored infants were occasionally admitted to

the pediatric services of general hospitals, though not infrequently when already ill with tuberculous meningitis or miliary tuberculosis.

DETERMINATION OF TUBERCULOUS INFECTION

All the children included in this analysis were considered to be infected with tuberculosis. The presence of infection was determined in most instances by the child's reaction to old tuberculin applied intradermally and read 48 to 72 hours later. A positive reaction was defined as one with at least a full centimeter of edema, erythema alone not being considered a definitely positive reaction.

Table 1 shows the various test doses of tuberculin and the number of children reacting to each dose at the time their initial x-ray was taken. It will be seen at once that there were 14 children either not tested or failing to return for readings, leaving 1,134 for whom a test and its result were recorded. Of these there were 7 for whom a negative reaction was noted, while the remaining 1,127 gave typically positive reactions.

Unfortunately, no consistent effort

TABLE 1

Number of Children Tested with Various Dosages of Old Tuberculin and Their Reaction at the Time of Initial Chest X-ray

| <i>Reaction to Old Tuberculin</i> | <i>White</i> | <i>Colored</i> | <i>Total</i> |
|---|--------------|----------------|--------------|
| Positive to 0.01 mg. | 36 | 101 | 137 |
| Positive to 0.1 mg. | 295 | 484 | 779 |
| Total reacting to 0.1 mg. or less | 331 | 585 | 916 |
| Positive to 1.0 mg. | 69 | 141 | 210 |
| Positive to more than 1.0 mg. | ... | 1 | 1 |
| Total reacting to 1.0 mg. or more | 69 | 142 | 211 |
| Total Positive Reactions | ... | ... | 1,127 |
| Negative to 0.1 mg. (Not tested further) | 1 | 5 | 6 |
| Negative to more than 1.0 mg. | ... | 1 | 1 |
| Total Negative Reactions | 1 | 6 | 7 |
| No tuberculin reading recorded | 3 | 11 | 14 |
| Total Children Tested | ... | ... | 1,134 |

was made to discover the smallest test dose of tuberculin necessary to produce a positive reaction; and accordingly this study can throw no light on the relationship between allergy level and extent of lesion. In 916, or 80.8 per cent, of the 1,134 tested, a reaction was obtained with 0.1 mg. or less of tuberculin; in 210, or 18.5 per cent, 1.0 mg. of tuberculin was used as a test dose when infection was discovered. Not infrequently 1.0 mg. was employed unnecessarily when the interval had been rather long since the latest negative result with that dosage.

Table 1 indicates a colored child reacting positively to a dose larger than 1.0 mg. of tuberculin. The test dose in this case was 2.0 mg., and it was applied to a year old infant with a chronic cough who was repeatedly negative to smaller doses. This child had five older siblings all of whom had become definitely positive to 0.1 mg. of tuberculin during association with fatal tuberculosis in the father, whose death took place before the infant in question was born. Later this patient coughed up half a peanut, his rather dubious x-ray findings cleared completely, and allergy could never be demonstrated at ordinary levels. In the light of observations such as those made by Furcelow, *et al.*,¹ who observed a high proportion of pseudo-reactions even among children requiring 1.0 mg. tests, it is possible that this child was never truly infected with tuberculosis. This is the only instance in the study where the author thinks infection is somewhat doubtful.

There are 6 children shown in Table 1 who gave negative reactions to 0.1 mg. and were not tested further. One was a white child of 11 years of age whose initial film showed a typically calcified primary complex. Of the 5 colored children in this category, 2 were less than 1 year and 2 years old, respectively, and both were suffering with acute miliary tuberculosis when brought to the dis-

pensary. Death occurred within a few days. Three others whose ages in two instances were 8 years and in the third 10 years, all showed well calcified nodes at the hilum in their initial chest films.

The colored child classified in Table 1 as negative to doses of tuberculin larger than 1.0 mg. is of special interest. She was 2½ years old when an extensive pneumonia of the left lung was discovered which showed no change in appearance and no indication of resolution during a hospital admission lasting nearly 5 months. During this interval repeated tuberculin testing was done, and the dosage increased to 10.0 mg. with only negative response. Repeated efforts to recover acidfast bacilli from the sputum and gastric contents failed. There had been known contact with sputum-positive tuberculosis in an adult member of her family for several weeks prior to the discovery of her lung condition. Another bout of exposure took place between her discharge at 2 years and 11 months, and her readmission at 3 years and 3 months, for pertussis and supposed pertussis pneumonia. On the second admission it became quite clear that a generalized tuberculosis was present, and this was proved at autopsy one month later. During the last month of her life small doses of tuberculin had been applied but not increased beyond 0.1 mg. and she was so acutely ill that her failure to react was not surprising. At autopsy a bilateral and very extensive tuberculous involvement of the tracheobronchial lymph nodes was found and blocks of tissue from the chronic pneumonia of the left lung revealed tuberculosis. It seems likely that from the age of 2½ years she had suffered from pulmonary tuberculosis, in spite of lack of allergy, and therefore she is included in this study from that age.

In addition to the children just described whose tuberculosis was considered to be established in the absence of a positive tuberculin reaction, there were

14 others included in Table 1 for whom no tuberculin test was recorded. Three were white children giving a history of contact with tuberculosis and ranging in age from 9 to 12 years. All 3 displayed calcification at the lung root, typical of old mediastinal tuberculosis. There were 11 untested colored children. Four of these were examined because of contact and showed calcification at the mediastinum; their ages were from 7 years to 12 years. The remaining 7 colored children all presented evidence of manifest tuberculosis on their first visit and all of them proved to be fatal cases: one, a boy of 14 years of age, was ill with advanced reinfection tuberculosis and lived only 3 days; the others were instances of fatal primary disease: a child of 6 years who lived nearly a year, and 5 others, all of them under 3 years of age and surviving from a few days to several months.

The foregoing discussion is an attempt to show that in the 21 instances where children have been included in this analysis without a positive tuberculin, the initial x-ray evidence of calcification of tracheobronchial lymph nodes, or of extensive pulmonary disease leading to an early death from tuberculosis, has been considered adequate evidence that the child was tuberculous at first observation.

INITIAL X-RAY FINDINGS IN TUBERCULOUS CHILDREN ACCORDING TO AGE AT DISCOVERY OF INFECTION

In making an analysis of initial x-ray findings it was essential to use only broad classifications. There were films without definite lesion in spite of the known positive reaction to tuberculin; a second group contained those showing only nodal lesions at the mediastinum, with or without the characteristically small primary focus visible; and a third class was made for the parenchymal lesions of the childhood type, nearly always rather gross shadows resembling

pneumonias and invariably associated with enlarged mediastinal nodes. Instances of miliary dissemination were entered in this class as well. A separate grouping was made for reinfection tuberculosis with its typical soft infiltration, usually beginning peripherally and nearly always located in the upper lobe, and in most instances appearing long after the primary complex had healed. When the same film showed lesions quite different in type, it was classified as belonging in the group considered to contain the more serious and extensive disease.

Tables 2 and 3 show the initial x-ray findings for white and colored by separate years to age 5, then for age groups 0-4, 5-9, and 10-14. Inspection of Table 2 for 404 white children shows that infected infants under 1 year of age had the smallest percentage of negative films and the largest percentage of parenchymal lesions of any age up to age 15. Only about 33 per cent escaped lesion of some kind, 22 per cent showed nodal tuberculosis, and 45.5 per cent displayed parenchymal involvement of the childhood type. As age increased, parenchymal involvement at first x-ray examination became less common, and had fallen to about 18 per cent for children age 1 year, and was found in only 8 per cent of the children examined for the first time at age 2 years. After 5 years of age, involvement of the lung parenchyma occurred only twice in 168 infected white children. One of these cases was reinfection tuberculosis in a 6 year old child whose disease became arrested after several years of observation. By 5 years of age it was usual to encounter nodal lesions of the mediastinum in about 30 per cent of the children examined for the first time, and this remained fairly constant to 15 years of age.

The corresponding tabulation for 744 colored children is shown in Table 3. Percentages for the first year of life are

TABLE 2

Distribution of Initial X-ray Findings in 404 Tuberculin-Positive White Children, According to Age at Examination

| Age | Number of children examined | Primary Tuberculosis | | | | | | | |
|---------|-----------------------------|----------------------|----------|--------------------|----------|---------------------|----------|--------------------------|----------|
| | | X-ray negative | | Nodal disease only | | Parenchymal lesions | | Reinfection Tuberculosis | |
| | | Number | Per cent | Number | Per cent | Number | Per cent | Number | Per cent |
| Under 1 | 55 | 18 | 32.7 | 12 | 21.8 | 25 | 45.5 | ... | ... |
| 1 | 85 | 41 | 48.2 | 29 | 34.1 | 15 | 17.6 | ... | ... |
| 2 | 58 | 24 | 63.2 | 11 | 28.9 | 3 | 7.9 | ... | ... |
| 3 | 24 | 20 | 83.3 | 4 | 16.7 | 0 | .... | ... | ... |
| 4 | 34 | 25 | 73.5 | 7 | 20.6 | 2 | 5.9 | ... | ... |
| 0-4 | 236 | 128 | 54.2 | 63 | 26.7 | 45 | 19.1 | ... | ... |
| 5-9 | 126 | 82 | 65.1 | 42 | 33.3 | 1 | 0.8 | 1 | 0.8 |
| 10-14 | 42 | 30 | 71.4 | 12 | 28.6 | 0 | .... | ... | ... |
| Total | 404 | 240 | 59.4 | 117 | 29.0 | 46 | 11.4 | 1 | 0.2 |

TABLE 3

Distribution of Initial X-ray Findings in 744 Tuberculin-Positive Colored Children, According to Age at Examination

| Age | Number of children examined | Primary Tuberculosis | | | | | | | |
|---------|-----------------------------|----------------------|----------|--------------------|----------|---------------------|----------|--------------------------|----------|
| | | X-ray negative | | Nodal disease only | | Parenchymal lesions | | Reinfection Tuberculosis | |
| | | Number | Per cent | Number | Per cent | Number | Per cent | Number | Per cent |
| Under 1 | 92 | 27 | 29.3 | 21 | 22.9 | 44 | 47.8 | ... | ... |
| 1 | 163 | 64 | 39.3 | 33 | 20.2 | 66 | 40.5 | ... | ... |
| 2 | 79 | 31 | 39.2 | 18 | 22.8 | 30 | 38.0 | ... | ... |
| 3 | 58 | 29 | 50.0 | 18 | 31.0 | 11 | 19.0 | ... | ... |
| 4 | 60 | 37 | 61.7 | 12 | 20.0 | 10 | 16.7 | 1 | 1.7 |
| 0-4 | 452 | 188 | 41.6 | 102 | 22.6 | 161 | 35.6 | 1 | 0.2 |
| 5-9 | 200 | 126 | 63.0 | 61 | 30.5 | 11 | 5.5 | 2 | 1.0 |
| 10-14 | 92 | 52 | 56.5 | 33 | 35.9 | 5 | 5.4 | 2 | 2.2 |
| Total | 744 | 366 | 49.2 | 196 | 26.3 | 177 | 23.8 | 5 | 0.7 |

almost identical with those for white infants. Colored tuberculin-positive children, however, continued to show this high prevalence of parenchymal involvement not only under 1 year, but also at age 1 and at age 2, with percentages at ages 3 and 4 years beginning to drop off and to approximate the findings for white infants at age 1 year. In colored children infected before 5 years of age, parenchymal lesions were found at first x-ray in nearly 36 per cent of those examined, while for infected white children of similar age, such extensive involvement was encountered in 19 per cent.

For infected colored children more than 5 years of age when first examined, there was a marked drop in the prevalence of serious lesions, but they were

much more numerous than in the white children of the same age. Parenchymal disease of the childhood type never dropped lower than 5 per cent at any age.

While there were only 5 cases of reinfection tuberculosis discovered at initial examination among 744 infected colored children, it should be said parenthetically that 19 others developed this type under observation; while in the white children studied, the one child among 404 who showed it on admission was the only instance encountered at any time in white children of this series.

MORTALITY FROM TUBERCULOSIS

In studying mortality from tuberculosis in these children, the number of

TABLE 4

Mortality from Tuberculosis During Various Time Periods After Discovery of Infection in 178 White and 334 Colored Children Found to be Tuberculin-Positive Before 3 Years of Age

| Interval from discovery of infection | Number of deaths during interval | | Mortality per cent during interval | |
|--------------------------------------|----------------------------------|---------|------------------------------------|---------|
| | White | Colored | White | Colored |
| First year | 8 | 37 | 4.5 | 11.2 |
| First 5 years | 14 | 57 | 8.1 | 18.3 |
| First 10 years | 14 | 59 | 8.1 | 19.8 |

observed deaths was related to the duration of observation of each individual, making it possible to calculate the risk of dying within 1 year or for any longer interval of time after the discovery of infection. The procedure followed was the modified life-table method, the application of which has already been described in detail in earlier publications.^{2, 3}

Mortality tables were set up for 10 years of observation of children falling into two different age groups at the time infection was discovered: those infected before age 3, and those found to be infected between ages 3 and 15 years. Only summary tables are presented here, derived from the more detailed calculations of the probability of dying.

Table 4 presents in summary form the mortality from tuberculosis in 512 children infected before age 3, of whom

178 were white and 334 were colored. For both races deaths were more frequent during the first year following discovery of infection than for any later annual period, and they account for more than half the mortality observed over ten years. At every time period shown, the colored suffered a mortality more than twice that of the white. For the first year following the discovery of infection, mortality was 4.5 per cent for the white and 11 per cent for the colored; at the end of 5 years the cumulative mortality for white was 8 per cent and for colored was 18 per cent. For the whole 10 year period, mortality from tuberculosis stood at 8 per cent for the white and had risen to 20 per cent for the colored.

In Table 5 the 512 children infected before 3 years of age are classified according to the presence or absence of

TABLE 5

Mortality from Tuberculosis in 512 Children, Infected Before Age 3, During Various Time Periods Following the Discovery of Infection, According to Lesion Shown at Initial X-ray Examination

| Deaths from Tuberculosis | | | | | | | |
|--------------------------------------|-----------------|---------------|----------|----------------|----------|-----------------|----------|
| Race | Number of Cases | Within 1 year | | Within 5 years | | Within 10 years | |
| | | Number | Per cent | Number | Per cent | Number | Per cent |
| Parenchymal lesion in first x-ray | | | | | | | |
| White | 43 | 7 | 16.3 | 9 | 20.9 | 9 | 20.9 |
| Colored | 140 | 31 | 22.1 | 44 | 32.4 | 46 | 35.8 |
| Total | 183 | 38 | 20.8 | 53 | 29.6 | 55 | 32.0 |
| No Parenchymal lesion in first x-ray | | | | | | | |
| White | 135 | 1 | 0.8 | 5 | 3.9 | 5 | 3.9 |
| Colored | 194 | 6 | 3.2 | 13 | 7.6 | 13 | 7.6 |
| Total | 329 | 7 | 2.2 | 18 | 6.0 | 18 | 6.0 |

parenchymal lesion in initial x-ray, and their mortality studied with these differences in mind. One hundred eighty-three showed parenchymal involvement, only one of which had reinfection tuberculosis. There were 329 children who showed only nodal disease or films without definite lesion.

Among 183 children showing parenchymal disease, 38 deaths from tuberculosis occurred within 1 year, a mortality of 21 per cent. This had risen to 30 per cent by the end of 5 years, and to 32 per cent by the close of 10 years of observation. Although mortality for the 43 white children during the first year of observation was 16 per cent while that for the 140 colored children was 22 per cent, this difference was not large enough to exclude the operation of chance. At later time intervals this racial difference became greater, the 10 year mortality being 21 per cent for white and 36 per cent for colored.

The remaining 329 children infected before age 3 whose first films showed no parenchymal lesion are shown in Table 5, with a combined mortality for the first year of observation of 2.2 per cent, to be contrasted with the first-year mortality of 21 per cent for children showing parenchymal shadows. By the end of 5 years of observation, the cumulative mortality for the combined races had become 6 per cent with no increase in mortality thereafter; and this figure is roughly one-fifth the risk noted for children admitted with more extensive disease.

The two races showed a difference in the force of mortality where the initial film showed no parenchymal lesion. The first-year rate for white children was 0.8 per cent; for colored it was 3.2 per cent, a fourfold difference. At the end of 5 years the rate had risen to nearly 4 per cent for white and 7.6 per cent for colored, and these rates stood for the total 10 year risk of death from tuberculosis.

The 140 colored children with initial parenchymal involvement, shown in Table 5, represent 42 per cent of the infected children examined under 3 years of age, while the 43 white children admitted with definite pulmonary lesions represent only 24 per cent of the infected white children under 3 years of age. This difference is highly significant statistically. The higher mortality from tuberculosis in colored children appears to be associated with their tendency to develop extensive lesions of the lung parenchyma more frequently than do white children. It has been shown in an earlier publication that even if they are admitted without parenchymal disease, they show a greater tendency to develop it within the next few months than do white children of similar age.⁴

Mortality became greatly diminished for children found to be infected later than age 3; and separate analyses for various age groups, each containing only small numbers of children, failed to reveal striking differences in the risk of death. Accordingly, children admitted at any age between 3 and 15 years of age have been considered together, and the mortality for 226 white and 410 colored children at various time intervals following infection is shown in Table 6 in summary form.

Only one death took place among the 226 white children. This occurred in a child admitted to observation with tuberculous pneumonia at age 6 and dying of tuberculous meningitis a few weeks later. This mortality of 0.4 per cent represents the total 10 year risk and is in contrast to the 10 year mortality of 8 per cent for white children infected prior to 3 years of age.

In the group of 410 colored children, 12 deaths from tuberculosis took place during the first year of observation, giving an observed mortality of 3 per cent. This rate had risen to 5 per cent by the end of 5 years, and to 7.6 per cent at the close of 10 years, a figure

TABLE 6

Mortality from Tuberculosis in 226 White and 410 Colored Children Whose Infection Was Discovered Between Age 3 and Age 15 Years; no Separation for Lesion

| Interval from discovery of infection | Number of deaths during interval | | Mortality per cent during interval | |
|--------------------------------------|----------------------------------|---------|------------------------------------|---------|
| | White | Colored | White | Colored |
| First year | 1 | 12 | 0.4 | 3.0 |
| First 5 years | 1 | 20 | 0.4 | 5.3 |
| First 10 years | 1 | 23 | 0.4 | 7.6 |

to be compared with a death rate of 19.8 per cent calculated for colored children infected before 3 years of age. The colored have a mortality only about half as high if they are found to be infected later than age 3. It is interesting to see how closely the mortality rates for the older *colored* group approximate those for the younger *white* group. Thus tuberculin-positive colored children at their more favorable period in childhood have a mortality from tuberculosis which just about equals the rates of infected white children at their more critical period.

The study of mortality in older children of the white race, according to extent of initial lesion, proved to be very simple. The 222 white children found infected after age 3 and showing no parenchymal involvement initially were all alive at the time these records were compiled. There were only 4 instances of initial parenchymal involvement and of these 1 had died within 1 year.

As usual, however, the colored presented a more striking picture. Forty-two of the 410 colored were admitted with pulmonary lesions visible in the initial film, and this 10 per cent is to be contrasted with 42 per cent showing such lesions when infection had occurred before 3 years of age. Thirty-seven of these 42 were regarded as parenchymal lesions of the childhood type, and their mortality can be compared with that of younger colored children showing comparable lesions.

Table 7 shows the mortality of these older colored children according to the presence or absence of childhood parenchymal lesions. There were 37 with parenchymal lesion and 368 without this finding initially.

Among the 37 instances of initial parenchymal disease, 9 deaths were observed during the first year of clinic observation, giving a mortality of 24 per cent; this had risen to nearly 34 per cent by the end of 5 years, and to 38 per cent for the whole 10 years of

TABLE 7

Mortality from Tuberculosis in 405 Colored Children Whose Infection Was Discovered Between Ages 3 and 15 Years, According to Initial X-ray Findings*

| Initial x-ray findings | Number of cases | Deaths from Tuberculosis | | | | | |
|------------------------|-----------------|--------------------------|----------|----------------|----------|-----------------|----------|
| | | Within 1 year | | Within 5 years | | Within 10 years | |
| | | Number | Per cent | Number | Per cent | Number | Per cent |
| Parenchymal lesion | 37* | 9 | 24.3 | 12 | 33.7 | 13 | 38.2 |
| No parenchymal lesion | 368 | 0 | .... | 4 | 1.3 | 6 | 3.3 |

* Exclusive of 5 cases of reinfection tuberculosis, 4 of whom died.

follow-up. These rates are nearly identical with those for colored children shown in Table 5 whose initial examination before age 3 years showed parenchymal involvement. It is probably justifiable to conclude that, for the colored, parenchymal lesions of the childhood type at any age during childhood carry about the same risk of death that they do in infancy.

The 368 colored children between the ages of 3 and 15 years, when examined and found to have no parenchymal lesion, showed similar percentages of nodal lesions and negative films as the younger group; yet this older and larger group suffered no deaths at all during the first year of observation, had a mortality of only 1.3 per cent by the end of 5 years, and a total mortality from tuberculosis of 3.3 per cent by the end of 10 years. This 10 year rate was less than half that calculated for colored children with comparable lesions whose infection took place before 3 years of age. We conclude that as the colored child grows older, if his tuberculous infection has produced no more than nodal disease at the time his infection is discovered, he has more capacity to control his disease than the infant with nodal involvement.

In Table 7 it was noted that there were 5 children of the colored race whose initial films showed reinfection tuberculosis. Their ages were 4, 6, 9, 13, and 14 years respectively. Four of these died in less than 2 years, 1 of

tuberculous meningitis rather soon after the discovery of tuberculosis, the other 3 of pulmonary tuberculosis. The 5th child, a girl of 13 years of age when observation began, had been followed 6 years when these records were compiled, and at that time her disease was considered arrested. Reference has already been made to 19 colored children admitted without reinfection tuberculosis who developed this type while under observation. There was only one white child of this study who showed reinfection tuberculosis on admission, and none was observed to develop it subsequently.

There was a total of 73 deaths from tuberculosis in children whose infection took place before 3 years of age. Fourteen of these fatalities were among white, and 59 among colored children. The immediate cause of death is shown in Table 8. Extra-pulmonary tuberculosis, notably miliary tuberculosis and tuberculous meningitis, accounted for more than 80 per cent of these deaths, and tuberculous pneumonia appeared to be the immediate cause of death in 16 per cent. Reinfection tuberculosis accounted for only 1 per cent. In the same table are shown the 24 deaths occurring in children whose infection was discovered between ages 3 and 15. All but one of these fatal cases were colored. Extrapulmonary tuberculosis was the immediate cause of death in less than 42 per cent, tuberculous pneumonia was considered responsible for death in 17 per cent, and reinfection

TABLE 8

Immediate Cause of Death from Tuberculosis in 73 Children Infected Before Age 3 and in 24 Children whose Infection Was Discovered Between Ages 3 and 15 Years

| Cause of Death | Infected before Age 3 Years | | Infection Found Between Ages 3 and 15 Years | |
|------------------------------------|--------------------------------|----------|--|----------|
| | No. of deaths | Per cent | No. of deaths | Per cent |
| Miliary Tuberculosis | 32 | 43.8 | 4 | 16.7 |
| Tuberculous Meningitis | 26 | 35.6 | 6 | 25.0 |
| Other Extrapulmonary Tuberculosis | 2 | 2.7 | 0 | .... |
| Post-Primary Tuberculous Pneumonia | 12 | 16.5 | 4 | 16.7 |
| Reinfection Tuberculosis | 1 | 1.4 | 10 | 41.6 |
| Total Fatalities | 73 | 100.0 | 24 | 100.0 |

tuberculosis was the cause of death in the remaining 42 per cent.

SUMMARY

In a series of 404 white and 744 colored children less than 15 years of age when found positive to tuberculin, chest lesions demonstrable at initial x-ray examination were more frequent and more serious in extent the younger the child. Infected children under 1 year of age behaved with remarkable similarity irrespective of race, showing enlarged tracheobronchial lymph nodes in about 22 per cent and extensive lesions of the lung parenchyma in 47 per cent. For *white* children a prompt reduction in the frequency of parenchymal lesions was noted as early as age 1 year, but *colored* children showed a sustained high prevalence of such lesions at initial examination for the first 3 years of life and barely approximated the decreasing risk noted in 1 year old white infants by the time they had reached 5 years of age.

Among older children, between 5 and 15 years of age at first examination, roughly 30 per cent of infected children of both races showed nodal involvement. For the *white*, parenchymal lesions of any kind were rare, occurring in less than 2 per cent. For the colored, parenchymal involvement of the childhood type appeared in nearly 6 per cent of initial films, and lesions of reinfection tuberculosis were seen in more than 1 per cent at first examination.

Over a 10 year period of observation, mortality from tuberculosis in white children infected before age 3, was calculated to be 8 per cent, while for colored children it was nearly 20 per cent. For both races more than half the risk of death was concentrated within the first year of known infection. Where infection was discovered between ages 3 and 15 years, the 10 year mortality

for white children was 0.4 per cent, and for colored it was 7.6 per cent.

Mortality was much higher for children admitted with parenchymal lesion. For the combined races, if infection took place before age 3, mortality was 21 per cent within 1 year, had risen to 30 per cent by the end of 5 years, and to 32 per cent for the whole 10 year period. Evidence was presented suggesting that white and colored suffer about equal risk of death if parenchymal disease can be demonstrated. The colored show many more of these serious lesions than do white children. Lesions of the lung parenchyma on first x-ray in older children of the colored race carried the same mortality as in younger children, but at these ages they were less frequent.

The total 10 year mortality from tuberculosis in white children infected before age 3 and showing only nodal lesions or negative films was about 4 per cent, while for the colored it was 7.6 per cent. White children presenting similar findings at first x-ray between ages 3 and 15 suffered no mortality during the period of observation, but colored children between these ages whose initial films showed no parenchymal lesion suffered a mortality of 3.3 per cent within a 10 year observation period. The lower death rate in children past infancy appears to be related to the lessened frequency of parenchymal involvement and to an improved resistance to nodal lesions.

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Public Health Organization in Mexico*

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SINCE the present Constitution of Mexico was enacted in 1917 public health in Mexico has been under the care of an autonomous institution, which is a part of the executive branch of the Federal Government. It is the Federal Department of Public Health and the National Council of Health. Its chief is a member of the Presidential Cabinet.

This was the first step taken on becoming aware of the great vital public health problems which the nation has to solve. As health education of the public spread over the country and new demands for health activities came from every corner of the nation, there followed a progressive increase in the budgets to meet the ever increasing requirements for health. On the other hand, the rapid development of communications has opened the road to the propagation of infectious and parasitic diseases which before were restricted to certain zones, with the result that the ancient division between national and local problems has been broken down. Thus, although the supreme sanitary law, the Federal Sanitary Code, marks the division of activities for federal and local authorities, it also invests the Federal Department of Health with full authority to act when the health of the nation is in danger, or when there is a neglect of duty by a local government. The last federal Sanitary Code was en-

acted in 1934, and by it the Federal Department of Health is authorized, first, to nominate a representative for every state and territory, and, second, to sign agreements with the local governments to coöperate with them and coördinate their efforts to get a single direction and orientation in the solving of public health problems either of general or local interest. This coöperative plan permits the Department of Health to guide and supervise all health activities over the country, and avoids many misunderstandings and duplication of activities which existed when several health organizations operated in a single state.

In effect then the basic organization of public health in Mexico is centralized in the state health officer, who is appointed by mutual agreement of the federal and local governments, and under this arrangement. With steadily growing appropriations, it has been possible to enlarge services, increase their number, and improve the health of the people at large.

The appropriations of the Federal Department of Health during the present decade are shown in Table 1.

TABLE 1

| Year | Appropriation | Per cent of Federal Budget |
|------|----------------|----------------------------|
| 1933 | \$6,532,487.46 | 2.79 |
| 1934 | 7,499,945.81 | 2.91 |
| 1935 | 10,480,000.00 | 3.80 |
| 1936 | 12,940,000.00 | 4.50 |
| 1937 | 14,870,000.00 | 4.46 |
| 1938 | 13,900,000.00 | 3.33 |
| 1939 | 16,500,000.00 | 3.70 |
| 1940 | 16,500,000.00 | 3.69 |
| 1941 | 19,000,000.00 | 3.88 |
| 1942 | 24,000,000.00 | 4.35 |

* Presented before the Health Officers Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

To these appropriations must be added appropriations of the individual states, so an average of \$1.00 to \$1.50 Mexican currency has been spent per capita during the last five years.

The advantages of the newer arrangement can better be understood on matters of sanitation and control of communicable diseases, as the Federal Government is more able to provide for economical and technical resources than is a local one. Further, when such problems arise, the Federal Department of Health is free to mobilize its forces in a kind of guerilla warfare, without hurting the sovereignty of an individual state.

In accordance with these general purposes, the Federal Department of Health is organized to extend its activities to all the aspects of modern public health practice. The present basic organization is as follows:

A. National Board of Health—

The National Board of Health, created by the Constitution of 1917, has advisory legislative, and judicial powers. It is formed by the heads of the higher offices and the directors of technical and administrative offices. They hold sessions every week and more often when an emergency arises.

B. Federal Department of Health—

1. Higher offices

a. Chief of the Department

As stated above, the Chief of the Department of Health in Mexico is a member of the Presidential Cabinet. He orients the general policies and guides the activities of the Institution.

b. Secretary General

The Secretary General has a rank equivalent to an undersecretary, and his activities are executive. He is in charge

of all the technical activities of public health.

Depending directly upon the Secretary General are:

- (1) *The School of Public Health and Hygiene*
- (2) *The Office of Technical Supervision*
- (3) *The Office of International Interchange*

c. Chief Clerk

The chief clerk or higher officer handles all matters concerning the administrative and financial aspects of public health. Under his care are the general administration office, the offices of administrative inspection, and legal administrative procedures. In the latter respect, it is worth while to state that the Federal Department of Health acts in a judicial capacity, as it can fine or even imprison any offender without any legal warrant, provided such an action is based on the law and regulations. This authority is extended to health officers in the states.

The different activities in public health are under the care and direction of the following group of divisions, which act in an advisory and supervisory capacity.

Such divisions can be gathered under three main headings:

A. Technical—

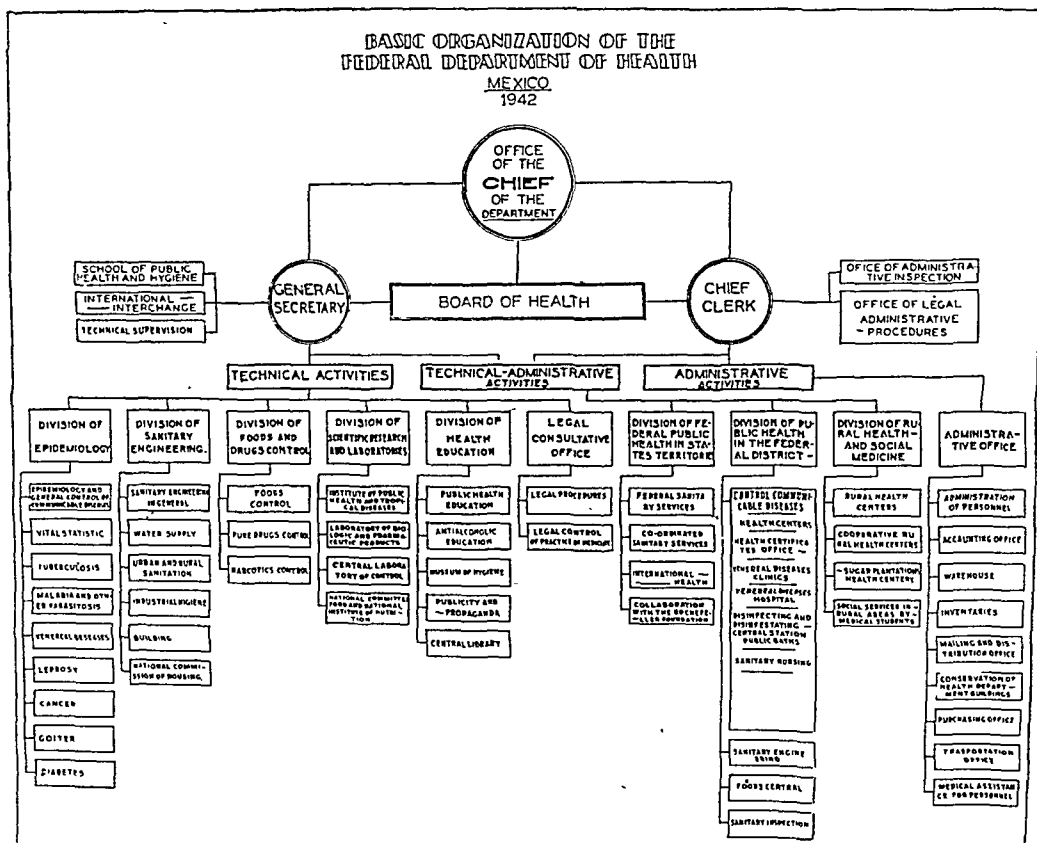
1. Division of Epidemiology

- a. Bureau of Biostatistics*
- b. Bureau of Epidemiology and General Control of Communicable Diseases*
- c. Bureau of Tuberculosis*

With this Bureau, the National Tuberculosis Committee coöperates very efficiently, and coördinates its efforts against tuberculosis.

d. Bureau of Malaria and other Parasitosis

Malaria and other parasitic diseases



like hookworm and onchocerciasis constitute such a problem in Mexico that the Federal Department of Health has established a special bureau in order to give particular attention to the solution of these vital problems of rural communities.

e. *Bureau of Venereal Disease Control*

f. *Section of other Preventable Diseases*

Several sections are in charge of the prophylaxis of leprosy, cancer, goiter, diabetes, and other preventable diseases.

2. *Division of Sanitary Engineering*

The Division of Sanitary Engineering includes various bureaus in charge of general sanitary engineering problems, urban and rural sanitation, industrial hygiene, the housing commission and water supplies. This last activity is one of the most important of this division.

It may seem paradoxical that, although Mexico is a tropical country, it is at the same time a dry one, and the Federal Government has to provide many rural zones with public water supplies. A special fund is set aside to finance water for rural communities.

3. *Division of Pure Foods and Drugs*

4. *Division of Research and Laboratories*

a. *The Institute of Public Health and Tropical Diseases for Research Work*

b. *The Central Laboratory*

c. *The Laboratory of Biologicals and Pharmaceuticals*

d. *The National Nutrition Committee and Institute*

5. *Division of Health Education*

The Division of Health Education orients and directs all educational activities to the public and provides the means and materials for such purposes.

A Museum of Hygiene in the City of Mexico was inaugurated during this year and it is growing progressively.

6. *Law Consulting Office*

This office is in charge of all matters concerning legal procedures and legislation. It also controls the practice of medicine and its branches.

B. *Technical and Administrative—Public Health Practice—*

1. *Division of Public Health for States and Federal Territories*

This division is the central office for all the state health organizations, and has control over all of them. Through a special bureau all matters related to quarantine services are supervised and controlled. A special bureau organized with the Rockefeller Foundation, the Office of Specialized Health Services, experiments with new methods of health practice, particularly in rural zones.

2. *Division of Rural Hygiene and Social Medicine*

Due to certain characteristics of rural Mexico, which constitutes about 80 per cent of the country, and due more particularly to our rural organization and distribution of land, the Federal Department of Health has been obliged to organize institutions which provide for medical care and public health activities in those rural zones which belong to rural communities and coöperative systems, called "Los Ejidos" (The Commons).

The health and medical care of people in these organizations are taken care of by the rural health centers which are financed either by the Federal Government alone, by coöperation with the "Ejidatarios" (commoners), or by the farmers themselves. This undoubtedly represents a step forward in the solution of the numerous problems with which Mexico has been faced since our Inde-

pendence days. It is augmented by co-operation with the Faculty of Medicine. This division sends to the field under its care and auspices, students of medicine who have finished their studies and are required to work during 6 months in the field before getting their diplomas. This plan serves three purposes, i.e., to provide rural communities with medical services they never had before, to find out through the surveys made by those students the problems of the zones in which they work, and to give the student a practical idea of the problems they will have to face in their future practice.

C. *Administration and Finances—*

To this end, the Department of Health concentrates all its administrative and financial activities in a central office which is under the jurisdiction of the chief clerk as stated above.

SUMMARY

In summary, this rapid glance at what Mexico is doing to solve its tremendous health problems and to keep step with the rest of the civilized world, emphasizes once and again that in public health administration there are neither standards nor norms which can be applied to every country, to all zones, and to all places alike. But at the same time we are aware that public health administration must be dynamic and never static.

So Mexico is looking forward to higher and higher standards of medical and health work, and to a more complete utilization of the invaluable aid which medicine, both curative and preventive, can give to its people, when it is practised in a coöperative spirit; but watchfulness and unselfish pains are always necessary, whatever the particular lines enlarged application of medical efficiency may take, and as the poet said:

Does the road wind uphill all the way?
Yes, to the very end, my friend.

Health Education in a War Relocation Project*

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I HAVE been asked to tell something of my recent two months' experience in a War Relocation Project. What of the organization for public health education among people torn from their homes by the necessities of war? I can give you a picture of the problem. I can point out some of its difficulties and some of its possibilities. I cannot, as yet, describe the problem as solved nor the program for health education organized. Public health workers, however, may recognize some of the factors present in this situation as characteristic of other new communities which are springing up throughout the land.

Migrations within civil populations have been unprecedented since Pearl Harbor. The evacuation of all citizens as well as aliens of Japanese ancestry from the west coast is only one example. While the military removal of civil populations is a strange experience in America, the shifting of populations through other necessities is not new. The "dust bowl" of the Middle West caused one such migration. The present increase of armed forces with the concomitant mushrooming of industry has brought another.

Americans and aliens of Japanese ancestry living on the west coast have

gone through a cataclysmic period since February 19, 1942, when the Secretary of War was given authority to prescribe military areas from which "any or all persons may be excluded." As a war-time necessity the War Department has evacuated some 100,000 persons from the west coast which was designated a military zone. Never in American history has there been a similar forced migration of such gigantic proportions.

These people, well over 60 per cent of whom were American born citizens, educated in public schools, taught by Caucasian teachers, schooled in democratic living, abandoned their homes and business enterprises and went to temporary assembly centers to await the preparation of permanent relocation projects. Dangerous aliens or individuals whose loyalty was suspected were not included here but were interned in prison camps. Relocation projects for these people have now been set up in 7 different states and are 10 in number. They were designed to provide habitation for evacuees and to give them an opportunity to work at industries which contribute to the country's present need, namely, food production and the manufacture of certain war materials.

Near the western boundary of Arizona on the Colorado River Indian Reservation 90,000 acres of fertile mesquite covered land lay waiting development into irrigated farms early in April. A dam had recently been completed so that water might be taken from the

* Presented at a Joint Session of the American School Health Association, and the Public Health Education and Public Health Nursing Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

river. Otherwise it was untouched desert. On May 12, just one month later, the first of the evacuees began to arrive. By the first week in September the population had risen to 17,819, and the settlement under the name of Poston had become the third largest city in the State of Arizona.

During this short period Army engineers had superintended the construction of barracks, the installation of a water system, the building of a sewage disposal plant, the construction of food storage facilities in a climate where temperatures reach well over 120°, and the building and equipment of hospital and clinic facilities for a community of 20,000 people.

The camp is laid out in 71 blocks, each of which houses some 250 or more people in 14 barracks containing 56 separate rooms, each 20 feet wide and 25 feet long. Separate buildings provide shower and toilet facilities for men and women, and there is a laundry building. Each block has one mess hall and kitchen and a recreation building for meetings and other activities. The necessities of life were thus provided in a wilderness for 20,000 people accustomed to 20th century American standards of living. Men, women, and children faced a new life and new work. How did they go about it?

The first step when a block was filled with evacuees was to organize a temporary local administrative staff. A block manager was chosen from the group. His function was to look after the needs of his community, listen to requests and complaints, pass on information for the guidance of the people, and to provide the channel for interchange of information between the general administrative staff of the project and the people.

The first duty of the manager was to see that the people were fed. Volunteer cooks were solicited from the group. The preparation and serving of food in the common mess hall would have taxed

the ingenuity of experienced and well trained cooks. The divergent tastes of youth, American born and accustomed to American food habits, and the tastes of old age, still clinging to the culture of the mother country, had to be met. Infants, who in addition to special milk formulae, required simple well cooked foods suitable for the first year of life, must be fed. The runabout child with his growth and energy requirements, not yet ready to digest and assimilate the highly seasoned combinations of food which older people crave, must be looked after. There were diabetics and minor cases of illness whose special feeding the home could not now provide. All of these nutritional problems were faced by volunteer cooks with no training and certainly no extensive understanding of the health implications involved.

The matter of nutrition gave the administrative staff deep concern. Careful checking, which showed that some of the 71 mess halls provided excellent food from the same supplies that seemed inadequate in other kitchens, indicated the problem to be one of local leadership. Plans were initiated for training each kitchen staff in the preparation and serving of palatable food, the planning of adequate menus from the food available, and for giving special training to selected persons in the preparation of food for infants and children and for invalids.

Rationing and transportation difficulties were two factors which entered into the problem of nutrition. These will increasingly disturb nutrition everywhere. Knowledge of food values and of alternate sources of essential foods is necessary to meet these problems.

Before discussing the organization of the community for health education it is necessary to understand the needs of the people and some of the peculiarities of the community in which they live. Some of the factors observed at Poston are common to other migrant groups,

and as such may possess significance to public health workers in areas given over, for example, to war industries.

A cursory investigation revealed at once the tremendous need for education, not alone for information, or for training in procedures for health protection, but over and above all else, for assurance, for morale, for a sense of security, for mental hygiene, by a people whose lives had been wrested from their foundations.

Here were people, many of whom had come from urban communities, suddenly thrust out on the desert, deprived of the security of their own homes, their accustomed community organization and services, and their economic independence, facing unknown, and to them terrifying, dangers. The heat, the dust, the rattlesnakes, the scorpions and the spiders were all factors in an environment new and strange and threatening. Regardless of the seriousness of these threats, the people needed to be reassured. They needed to know how to live in safety and some degree of comfort in temperatures above any they had ever experienced. They needed to know how to use salt to replace that lost by the body through perspiration. They needed to know, as the dust swirled around them in clouds, that dust blown from an open field, disagreeable as it may be, is a nuisance rather than a health hazard and that it does not threaten them with tuberculosis or silicosis. They needed to know the truth about the danger from insects and to have their fears removed regarding rattlesnakes.

Fear of the unknown is instinctive and is necessary to self preservation in an unfriendly world. But freedom from fear is one of the freedoms Americans are fighting for and it requires education. To enjoy security, health, peace of mind, man must know and understand the environment in which he lives.

Here was a community in which adequate provision had been made for the

necessities of community living; for safeguarding health through proper facilities for sewage disposal; through a safe and well guarded water supply; through an organized and well equipped fire department; through food doubly inspected and safeguarded as to quality and safety. Here was a community provided with a hospital staffed by well trained physicians and surgeons and equipped to meet any ordinary emergency. Yet, with all this, fears based on ignorance of what had been done to safeguard the community were rampant. Rumors that the water was not safe, that the sewage disposal plant was inadequate, that the fire fighting equipment was not up to standard, that the food was spoiled, that the hospital could not perform the simplest emergency operation ran through the community to destroy morale. The community needed to know the services that had been provided and how to use them wisely.

The situation at Poston was not unusual. Any community, be it old or new, must provide opportunities for the public to become familiar with community services if these are to be satisfactorily used. The best community services in the world fall short of fulfilling their function when the people are not secure in their use.

Large numbers of calls came in to the hospital for medical home visits—calls in excess of what could be met by the limited medical staff. In some cases these were for urgent conditions, but more often they were for minor ills. There was need for educating the public in the proper use of the medical facilities. With the increasing shortage of medical services available in every civilian community it is increasingly important that this education be provided everywhere.

The changed pattern of living, from that of the home unit to a group of fifty or sixty families, sharing a community mess hall, community showers

and latrines and laundry, presented another problem. It is difficult enough for soldiers to give up the privacy of home life and to share responsibility for the sanitation of a community shower and latrine, and to accept food which has been prepared to meet the needs of the group rather than the tastes of the individual. It is doubly hard for this adjustment to be made by whole families. Here again were unnecessary fears, bred by ignorance.

There was the fear of "athlete's foot," without adequate knowledge of how to protect oneself; fear of contracting one of the social diseases through the least likely avenue of infection, the common shower and latrine; fear of undernourishment because it was impossible to provide food for the family in the usual way. Mothers in particular needed help in making the adjustment to a new way of caring for their families. Their feeling of frustration in giving up control of the family life was acute. Yet there were constructive things to be done for the family that were within their control. Training in infant care and in home care of the sick were never more needed.

Turning from the problems felt by the people to a consideration of the group itself, an important characteristic is discovered. A new community lacks at first the coherence that makes work with it as a group possible. Coming from different localities, from all walks of life, and from divergent backgrounds, no one at first knows his neighbors and their capacities, or their potential contribution to the life of the community. People have not yet bound themselves together. Farm women living side by side with university graduates found little community interest. How helpful cohesiveness within a group can be is more fully appreciated after one has attempted to work in a community in which it is lacking. At Poston it was observed that some communities got to-

gether more quickly than did others and that those offered better opportunities for educational programs. The members of such groups came from similar backgrounds.

Another characteristic in this community was the fact that the channels through which education can function most effectively were not yet available. The health educator who goes into a new community will find it necessary to work with other groups on organization and the development of channels through which information may flow and by means of which members of the community may undertake to solve their own problems.

Under the leadership of the administrative staff, community services for the entire camp were organized. A census of the entire population was taken, and information as to the specific abilities of each person was classified. An employment bureau utilized this information in locating qualified individuals as they were needed for various tasks. A recreation department to provide immediate activities for young and old during the difficult period of adjustment was set up.

Church groups were organized. Daily vacation Bible and Buddhist schools were opened. Parents asked for nursery schools and young women volunteers organized these very creditably. Plans began to take shape for public schools, and young men and women, college graduates untrained in pedagogy, volunteered to take special teacher training which the administration offered. Volunteers set about making building bricks of adobe, since no materials were available for constructing schools. A news sheet was started by a group of young reporters and journalists. Adult classes in English and women's clubs began to appear. The machinery of self government was set up under the leadership of the legal members of the administrative staff and young evacuee lawyers.

Thus the channels for education began to take shape. The health department was organized under two branches, hospital and clinic services on the one hand, and public health services on the other. Under public health were included activities for communicable disease control, for sanitary inspections, for maternal and child welfare, for community nursing, for vital statistics and records, for nutrition, for health education.

If new communities lack the usual established channels for educational work, there are advantages to counterbalance this handicap. No set pattern can hamper the development of the program in accordance with the best thought of the present moment. It is possible to take the reports of national professional organizations, defining, for example, the functions of a health educator, and use these to set up the pattern for health education activities in the health department. The outline for school health policies, approved by recognized national groups, can be used to direct the program planning of the public school system. The lack of previously conceived ideas which might block sound development of the program is a decided advantage.

Because the slate was clear at Poston, plans could be made to permit maximum participation of the community in the discussion of its own problems. The organization of a Board of Health, on which were to be placed lay representatives of the community in addition to representatives of the professional group, was proposed. A channel would thus be provided through which the community could be kept in-

formed as to the thinking that went on behind the passage of health and sanitary regulations. This channel would also serve to keep professional workers informed as to special situations in the home and community that had a bearing on the acceptance of these regulations. In this way the health program would stem from the community itself under the guidance of professionally trained personnel.

The health educator, working under the health department, utilizing the various channels opening up throughout the community, interpreting the community and its services to the people, will be able to bring about better understanding and better use of the services provided, and to bring new security to the people.

The need and opportunity for health education in this war relocation camp are doubtless a duplication of needs and opportunities in innumerable other communities throughout the land. The break-up of old patterns of living; the insecurity of masses of people living in new surroundings; the urgency of the need in industrial and civil and army life for man power, unhampered by physical ailments and mental stresses; the steadily diminishing professional health services in civil life, must all be faced. Whether in an evacuee camp or in factory or training center where essential war industry is going forward, a clear-cut recognition of the problems existing in communities made up of migrant groups is needed. The development of sound educational programs is one part of our program for winning the war.

Field Observations of Tuberculosis Patients in Rural Areas of Tennessee*

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THE Tennessee Department of Public Health has maintained for a number of years mobile field units for tuberculosis case finding in the rural sections of the state. A clinician and an x-ray technician, using portable x-ray equipment, conduct regularly scheduled clinics in counties with local health departments.† Organization of the clinics and subsequent follow-up service are the responsibility of the local health officers and nurses. Recommendations concerning reëxamination, collapse therapy, and frequency of nursing visits are sent to the local health officer and the private physician with the report of the x-ray findings for each person examined. Since hospital facilities are limited for residents of the rural sections of the state and treatment must be carried out at home, the personnel of the local health departments have considerable responsibility in the control of the disease.

In order to understand fully the tuberculosis problem, information is necessary concerning the progress of the cases subsequent to diagnosis. What happens to the persons diagnosed as having tuberculosis? How long do they live? What effect does the extent of the lesion and sputum status have on mortality? What percentage receive hospital care? Answers to these and similar questions

are valuable in formulating effective measures for the control of this disease.

Through regular visits to tuberculosis patients the local nurses routinely gather information which can be used in answering these questions. The local health departments are asked to send in periodically certain data which are readily available from records in the office. Query sheets are sent from the central office each month, requesting information concerning the present status (living or dead) of each case, whether or not collapse therapy has been received during the past twelve months, and dates of hospitalization for treatment of tuberculosis during that period.

These query sheets were first used in 1937 to learn the status of the cases diagnosed in 1936. The same information was requested concerning persons with active lesions and with lesions considered arrested at the time of diagnosis and, also, of children with first infection type lesions that were causing signs and/or symptoms. This paper presents the experience of tuberculosis patients diagnosed in field clinics from 1936 to 1940, inclusive. Nearly all of the data published elsewhere regarding the subsequent course of tuberculosis patients relate to persons who have received institutional care, while this study is concerned with patients of whom only a small percentage received hospital care or any form of special treatment.

In all, 5,056 white and 599 colored persons were under observation for periods of time varying from a few

* Presented before the Health Officers Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

† The field units do not conduct clinics in the four counties with cities of 100,000 population or over since those counties have their own programs.

TABLE 1

Classification of Cases of Tuberculosis According to Activity and Extent of Lesion on Diagnosis, by Color and Sex

| Activity and Extent of Lesion | White | | | Colored | | |
|-------------------------------|-------|-------|--------|---------|------|--------|
| | Total | Male | Female | Total | Male | Female |
| Total Cases | 5,056 | 1,989 | 3,067 | 599 | 258 | 341 |
| Active | | | | | | |
| Minimal | 1,057 | 345 | 712 | 159 | 57 | 102 |
| Moderately Advanced | 1,151 | 478 | 673 | 141 | 59 | 82 |
| Far Advanced | 946 | 423 | 523 | 216 | 110 | 106 |
| Arrested | | | | | | |
| Minimal | 1,497 | 557 | 940 | 60 | 22 | 38 |
| Moderately Advanced | 320 | 148 | 172 | 7 | 3 | 4 |
| Far Advanced | 9 | 5 | 4 | .. | .. | .. |
| Manifest First Infection | 76 | 33 | 43 | 16 | 7 | 9 |

months to five years. The classification of these cases, according to activity and extent of lesion, by sex, is shown in Table 1.

Of the white cases regarded as active, 1,057 were classed as minimal, 1,151 as moderately advanced, and 946 as far advanced. The largest group of white patients (1,497) was that with minimal arrested disease, while the largest colored group (216) was that with far advanced disease. There were 159 colored persons with minimal active lesions, 141 with moderately advanced active,

and only 67 with lesions considered arrested when first diagnosed. A higher proportion of the white patients under observation were females than males. This was due to a preponderance of females among those with minimal lesions, both active and arrested. Among the colored patients, also, the proportion of females was greater than that of males.

Since the age distribution of the cases is important in studying mortality, data are presented in Table 2 for three age groups, by color.

TABLE 2

Age Distribution of Cases of Tuberculosis According to Activity and Extent of Lesion on Diagnosis, by Color

| Activity and Extent of Lesion | Total | | Under 35 Years | | 35-54 Years | | 55 Years and Over | |
|-------------------------------|--------|----------|----------------|----------|-------------|----------|-------------------|----------|
| | Number | Per cent | Number | Per cent | Number | Per cent | Number | Per cent |
| White | | | | | | | | |
| Total Cases | 5,056 | 99.9 | 2,231 | 44.1 | 1,938 | 38.3 | 887 | 17.5 |
| Active | | | | | | | | |
| Minimal | 1,057 | 100.0 | 692 | 65.5 | 297 | 28.1 | 68 | 6.4 |
| Moderately Advanced | 1,151 | 99.9 | 517 | 44.9 | 424 | 36.8 | 210 | 18.2 |
| Far Advanced | 946 | 100.1 | 556 | 58.8 | 272 | 28.8 | 118 | 12.5 |
| Arrested | | | | | | | | |
| Minimal | 1,497 | 99.9 | 349 | 23.3 | 788 | 52.6 | 360 | 24.0 |
| Moderately Advanced | 320 | 99.9 | 35 | 10.9 | 155 | 48.4 | 130 | 40.6 |
| Far Advanced | 9 | 100.0 | 6 | 66.7 | 2 | 22.2 | 1 | 11.1 |
| Manifest First Infection | 76 | 100.0 | 76 | 100.0 | ... | .... | ... | .... |
| Colored | | | | | | | | |
| Total Cases | 599 | 100.0 | 414 | 69.1 | 143 | 23.9 | 42 | 7.0 |
| Active | | | | | | | | |
| Minimal | 159 | 100.1 | 113 | 71.1 | 37 | 23.3 | 9 | 5.7 |
| Moderately Advanced | 141 | 100.0 | 92 | 65.2 | 40 | 28.4 | 9 | 6.4 |
| Far Advanced | 216 | 100.1 | 174 | 80.6 | 30 | 13.9 | 12 | 5.6 |
| Arrested | | | | | | | | |
| Minimal | 60 | 100.0 | 18 | 30.0 | 32 | 53.3 | 10 | 16.7 |
| Moderately Advanced | 7 | 100.0 | 1 | 14.3 | 4 | 57.1 | 2 | 28.6 |
| Manifest First Infection | 16 | 100.0 | 16 | 100.0 | ... | .... | ... | .... |

For the most part, those under observation were young adults with a higher percentage of colored patients in the younger age groups than of white. Of the individuals with active tuberculosis, 73 per cent of the colored and 56 per cent of the white were under 35 years of age. Persons with arrested lesions at the time of diagnosis were older than those with active lesions.

MORTALITY EXPERIENCE

One method of studying mortality is to compare the actual number of deaths from all causes with the number expected. The actual number of deaths and the expected number,* according to activity and extent of lesion, with the ratios of actual to expected deaths, by color, are shown in Table 3.

TABLE 3

Actual and Expected Deaths Among Tuberculosis Cases, with Ratios, According to Activity and Extent of Lesion on Diagnosis, by Color

| Activity and Extent of Lesion | White | | | Colored | | |
|----------------------------------|------------------|--------------------|--------------------|------------------|--------------------|--------------------|
| | Actual Deaths | Expected Deaths | Ratio Act./Exp. | Actual Deaths | Expected Deaths | Ratio Act./Exp. |
| Total Cases | 909 | 116.4 | 7.8 | 233 | 13.8 | 16.9 |
| Active | | | | | | |
| Minimal | 49 | 16.8 | 2.9 | 16 | 4.5 | 3.6 |
| Moderately Advanced | 220 | 25.4 | 8.7 | 45 | 3.3 | 13.6 |
| Far Advanced | 567 | 11.3 | 50.2 | 167 | 2.6 | 64.2 |
| Arrested | 71 | 62.4 | 1.1 | 3 | 3.2 | 0.9 |
| Manifest First Infection | 2 | 0.5 | 4.0 | 2 | 0.2 | 10.0 |

In this group of cases over 1,000 (909 white and 233 colored) deaths from all causes occurred, with more than one-half among those with far advanced disease. Only 49 deaths occurred among white patients with minimal active disease and 16.8 were expected in that group. In the moderately advanced active group, 220 deaths occurred, or 8.7 times as many as were expected, while among the far advanced there were 50 times as many as expected. The ratios of actual to expected deaths among the

colored patients with active tuberculosis were: 3.6 to 1 for those with minimal lesions, 13.6 to 1 for those moderately advanced, and 64.2 to 1 for those with far advanced disease.

The 71 deaths observed in the white group with arrested lesions when first diagnosed were only slightly more than the number expected, 62.4, and the numbers of actual and expected deaths were the same for the colored patients with arrested lesions. Consequently, the death rate is not materially increased by persons with such a diagnosis.

When the data were divided according to age at death, the ratio of actual to expected deaths was higher in the age group under 35 years than in the older age groups for persons with active tuberculosis. However, there was no

difference in the ratios according to age for those with arrested lesions. In considering these data from the viewpoint of administration of a tuberculosis program, it seemed advisable to discontinue follow-up service to individuals with arrested disease when diagnosed, since the mortality of this group was of the same order as that in the general population.

The experience in the state for white persons with active tuberculosis has been compared with that in Williamson County, Tenn.,^{1*} and with that in Cat-

* To determine the number of deaths that would be expected, the age-specific death rates from all causes in Tennessee for the years 1938-1939 were applied to the population in each group.

* Data presented here for Williamson County include those contained in previous publications and also data gathered subsequent to publication.

taraugus County, N. Y.,² as shown in Table 4. Those diagnosed as tuberculous in the field clinics include persons examined because of symptoms referable to the chest and contacts of known cases. In Williamson County, the experience includes all known cases of tuberculosis in the county. The Cattaraugus County data are similar to those of Williamson County in that the method of selection of patients was the same. One difference between the two studies is that a high percentage of patients in Cattaraugus County received hospital care.

The ratios of actual to expected deaths were smaller for the Williamson County cases than for those diagnosed in field clinics in the state. This is probably due to the fact that the Williamson County data include individuals with little or no disability, as well as a larger proportion of cases in the older age groups. For Cattaraugus County,

TABLE 4

Ratio of Actual to Expected Deaths Among Active White Cases of Tuberculosis by Extent of Lesion on Diagnosis, for Rural Areas of Tennessee, for Williamson County, Tenn., and for Cattaraugus County, N. Y.

| Extent of Lesion | Rural Tennessee | Williamson County | Cattaraugus County |
|---------------------|-----------------|-------------------|--------------------|
| Minimal | 2.9 | 0.7 | 5.3 |
| Moderately Advanced | 8.7 | 4.2 | 9.9 |
| Far Advanced | 50.2 | 13.9 | 48.1 |

however, the ratios were of the same order as those obtained for the rural areas of Tennessee.

In order to determine how long these patients live after diagnosis, the cumulative mortality from all causes during the first five years after diagnosis has been computed according to the method outlined in a previous publication.³ Table 5 and Figure 1 show these percentages for the patients with active tuberculosis, by extent of lesion and color.

FIG. 1

CUMULATIVE MORTALITY FROM ALL CAUSES, PER 100, AMONG ACTIVE CASES OF TUBERCULOSIS DURING FIVE YEARS FOLLOWING DIAGNOSIS, BY EXTENT OF LESION AND COLOR

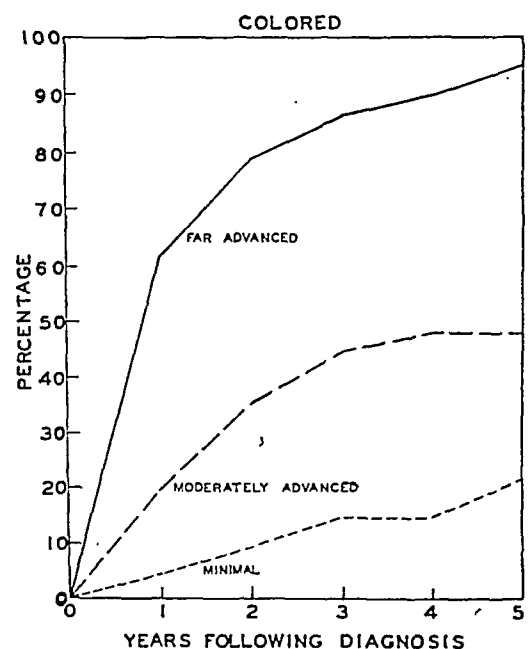
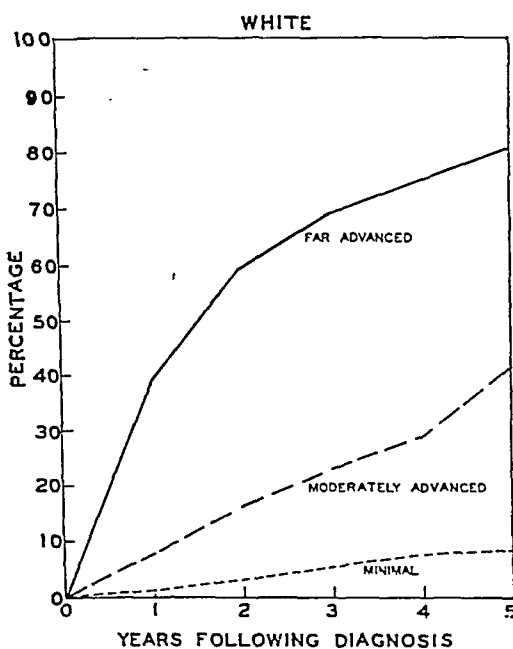


TABLE 5

Cumulative Mortality from All Causes, per 100, Among Active Cases of Tuberculosis During Five Years Following Diagnosis, by Extent of Lesion and Color

| Years Following Diagnosis | Minimal | | Moderately Advanced | | Far Advanced | |
|------------------------------|---------|---------|---------------------|---------|--------------|---------|
| | White | Colored | White | Colored | White | Colored |
| 1st | 1.3 | 4.5 | 8.1 | 19.5 | 39.2 | 61.6 |
| 2nd | 3.4 | 9.6 | 16.5 | 35.1 | 59.6 | 79.1 |
| 3rd | 5.7 | 14.8 | 23.7 | 44.6 | 69.5 | 86.7 |
| 4th | 8.0 | 14.8 | 29.3 | 48.2 | 75.5 | 90.3 |
| 5th | 8.7 | 21.6 | 42.0 | 48.2 | 81.1 | 95.2 |

Mortality was excessive during the first year after diagnosis for persons with far advanced lesions, since 39.2 per cent of the white and 61.6 per cent of the colored cases were dead by the end of the first year. By the end of the fifth year, 81.1 per cent of the white patients having far advanced disease and 95.2 per cent of the colored had died. In the moderately advanced group, the mortality was much lower. Of the white patients, 8.1 per cent died during the first year and 42.0 per cent were dead by the end of the fifth year following diagnosis. The percentages were higher for the colored, 19.5 the first year and 48.2 by the end of the fifth. The mortality experience of white patients with minimal lesions was low. Only 1.3 per cent of these died the first year after diagnosis and only 8.7 per cent were dead by the end of the fifth year. For the colored, the percentages were 4.5 the first year and 21.6 by the end of the fifth.

To study mortality according to sputum status, the active white cases were classified according to results of sputum

examinations made within two months of the date of diagnosis. Since the sputum was positive in only 7 of the minimal cases within that period, subsequent mortality could not be studied. Of the moderately advanced group, 176 had positive sputum and 218 negative sputum at the time of diagnosis. Of the far advanced group, the numbers were 389 and 50, respectively. Table 6 and Figure 2 show the cumulative mortality of the active white cases with moderately advanced and far advanced lesions according to sputum within two months of diagnosis.

The cumulative mortality in moderately advanced cases with positive sputum was much higher than that observed in those with negative sputum. The percentage dead by the end of the first year was 13.7 for those with positive sputum and 7.1 for those with negative sputum. By the end of the fifth year, over half (58.3 per cent) of those with positive sputum had died and slightly less than a fourth (24.3 per cent) of those with negative sputum. Among the patients with far advanced lesions and

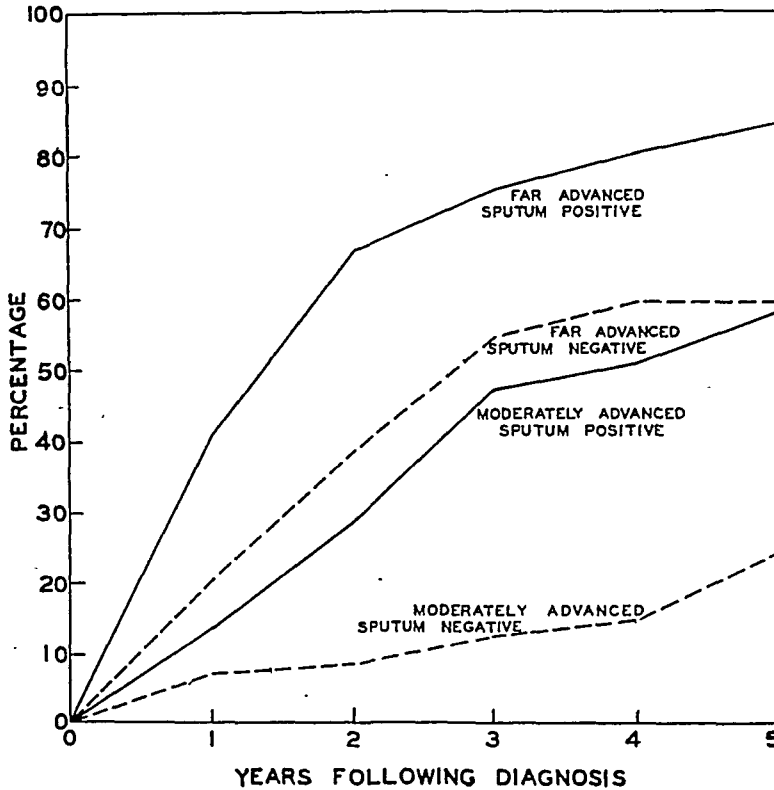
TABLE 6

Cumulative Mortality, per 100, of Active White Cases with Moderately Advanced and Far Advanced Lesions, According to Sputum on Diagnosis

| Years Following Diagnosis | Moderately Advanced | | Far Advanced | |
|------------------------------|---------------------|--------------------|--------------------|--------------------|
| | Sputum Positive | Sputum Negative | Sputum Positive | Sputum Negative |
| 1st | 13.7 | 7.1 | 41.2 | 20.2 |
| 2nd | 28.5 | 8.5 | 67.0 | 38.6 |
| 3rd | 47.0 | 12.3 | 75.2 | 54.7 |
| 4th | 51.4 | 14.8 | 80.7 | 60.0 |
| 5th | 58.3 | 24.3 | 84.6 | 60.0 |

FIG. II

CUMULATIVE MORTALITY PER 100 OF ACTIVE WHITE CASES
WITH MODERATELY ADVANCED AND FAR ADVANCED LESIONS
ACCORDING TO SPUTUM ON DIAGNOSIS



positive sputum the mortality was great, with 41.2 per cent dead by the end of the first year and 84.6 per cent by the end of the fifth. Among those with negative sputum, the percentages were lower, 20.2 and 60.0, respectively. Thus, it is shown that the risk of death is much greater for those with positive sputum at the time of diagnosis than for those with negative sputum, in both moderately and far advanced groups.

Hilleboe⁴ has published data regarding survival rates from which cumulative mortality according to extent of lesion and sputum status was obtained for persons discharged from public sanatoria in Minnesota. Mortality rates based on observations from date of discharge from sanatoria exclude many

deaths which are included when observation begins with date of diagnosis. The mortality experience of patients discharged with moderately advanced lesions and positive sputum from 12 rural sanatoria in Minnesota was, however, similar to that observed in Tennessee for cases moderately advanced and with positive sputum at the time of diagnosis. By the end of the first year, 17.5 per cent of the Minnesota patients were dead and 13.7 per cent of those in Tennessee; by the end of the fifth year, the percentage dead was 57.8 for Minnesota and 58.3 for Tennessee. Among the patients with far advanced disease and positive sputum, the mortality was greater for those in Tennessee than for those in Minnesota.

HOSPITALIZATION AND PNEUMOTHORAX TREATMENT

The only county sanatoria in Tennessee are located in the four counties containing large cities, and admit only residents of those counties. For the population served by the field diagnostic units, hospital facilities are limited, with the result that in only a small percentage of cases is such care received during the first year following diagnosis. Since July 1, 1939, a program has been in effect whereby the state pays half the daily rate in general hospitals or in private sanatoria and local agencies the balance to hospitalize indigent patients suitable for collapse therapy. The number and percentage of white persons hospitalized for tuberculosis and the number and percentage receiving pneumothorax treatment during the first year following diagnosis, by year of diagnosis, are shown in Table 7.*

year following diagnosis. Pneumothorax treatment was stated as being received by only 5 patients diagnosed in 1937; by 1940, this number had increased to 55. In view of the difficulties encountered in securing pneumothorax treatment and hospital care for patients in the rural areas of the state, these results are encouraging.

Many factors are responsible for the increase in percentage of patients receiving hospital care and pneumothorax treatment. The local health officers and nurses do much to interest the patient in obtaining some form of collapse therapy and to arrange ways and means. The clinicians of the diagnostic units consult with the local physicians concerning treatment of the cases. Educational measures, as well as the recent state hospitalization program, are responsible for increases in the numbers of patients receiving such care.

TABLE 7

Number and Percentage of White Patients Hospitalized for Tuberculosis and Number and Percentage Receiving Pneumothorax Treatment During the First Year Following Diagnosis, by Year of Diagnosis

| Year of Diagnosis | Total Patients | Hospitalized | | Pneumothorax | |
|----------------------|-------------------|--------------|----------|--------------|----------|
| | | Number | Per cent | Number | Per cent |
| 1936 | 380 | 13 | 3.4 | * | * |
| 1937 | 690 | 27 | 3.9 | 5 | 0.7 |
| 1938 | 615 | 35 | 5.7 | 24 | 3.9 |
| 1939 | 611 | 38 | 6.2 | 33 | 5.4 |
| 1940 | 624 | 60 | 9.6 | 55 | 8.8 |

* Not available

Only 13, or 3.4 per cent, of the 380 white patients diagnosed in 1936 entered a hospital for treatment of tuberculosis within a year of diagnosis. By 1940, however, 60, or 9.6 per cent, received hospital care during the first

SUMMARY

1. Results of observations of tuberculosis patients followed from a few months to five years from date of diagnosis are presented for 5,056 white and 599 colored cases diagnosed in field clinics in the rural areas of Tennessee.

2. Among patients with active tuberculosis, the actual number of deaths from all causes was larger than the number expected. Arrested lesions, however, did not affect mortality appreciably in either the white or the colored group.

3. The risk of death was much greater for patients with positive sputum at the time of diagnosis than for those with negative sputum, in both the moderately advanced and far advanced groups.

* Data are presented for white cases only since the number of colored cases in which such care was received was too small for discussion. In considering hospitalization, patients who removed from the county to enter a hospital for treatment of tuberculosis have been included, since information concerning their status, etc., was obtained from the family. Persons who removed from observation during the first year are not included in the totals for each year.

4. The percentage of patients hospitalized and the percentage receiving pneumothorax treatment within the first year following diagnosis were small but increased each year.

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Accuracy of Tuberculosis Death Rates in Williamson County, Tenn.*

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DEATH rates from tuberculosis are known to be very high in many of the southern states.^{1, 2, 3} These high rates are in part due to the racial composition of the population since the colored population is largely concentrated in the South and the tuberculosis death rates in the colored population are two or three times the rates in the white population. The rates in the white population are also high in certain southern states with exceedingly high rates in the older age groups. Questions are often raised regarding the accuracy of classification of the cause of death for persons in the older age groups. Do these people actually die from tuberculosis?

The purpose of this report is to compare tuberculosis mortality in Tennessee and the United States and to present an analysis of the data which have been collected regarding tuberculosis deaths officially recorded as such for the 10 year period 1932-1941 for Williamson County, Tennessee. Evidence obtained through clinical and x-ray examination, sputum analysis, and by direct observa-

tion is available for over three-fourths of the persons officially recorded as having died from tuberculosis in Williamson County.

DEMOGRAPHICAL EVIDENCE

In the comparison of tuberculosis mortality, the death rates for the United States for 1939 and for Tennessee for the 3 year period centering in 1939 have been calculated.

The crude white tuberculosis death rate for Tennessee of 60.0 per 100,000 population was 59 per cent higher than the rate of 37.7 for the United States. The difference was even greater when the Tennessee death rate was adjusted for the age distribution of the population of the United States, resulting in a rate of 66.5 per 100,000 population. In the United States as a whole the white male death rate of 44.7 was higher than the white female rate of 30.6, while in Tennessee the opposite was true with the female rate of 62.2 slightly higher than the male rate of 57.8 per 100,000 population. The white female death rate in Tennessee of 68.4, adjusted to the age distribution of the white female population of the United States, was over twice as high as the white female rate of 30.6 for the United States, while the adjusted white male rate in Tennessee of 64.7 was 45 per cent higher than that for the United States. The

* Presented before the Vital Statistics Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

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Acknowledgement is made of the valuable suggestions of Dr. J. A. Doull.

TABLE 1

Tuberculosis Death Rates per 100,000 Population by Age, Sex, and Color for United States, 1939

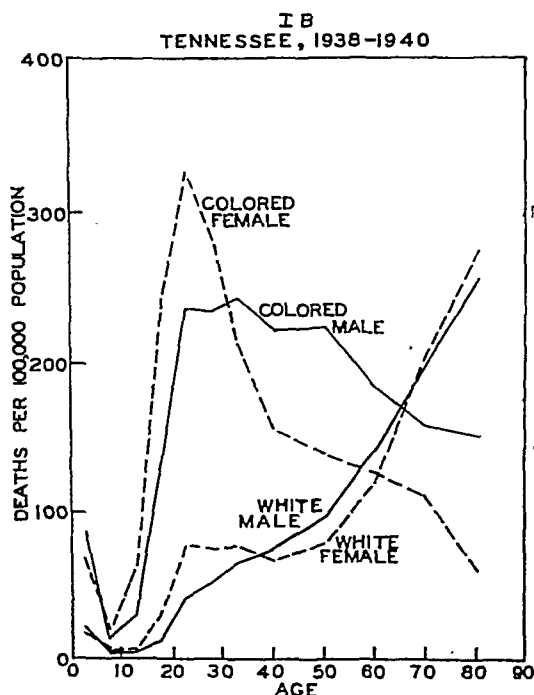
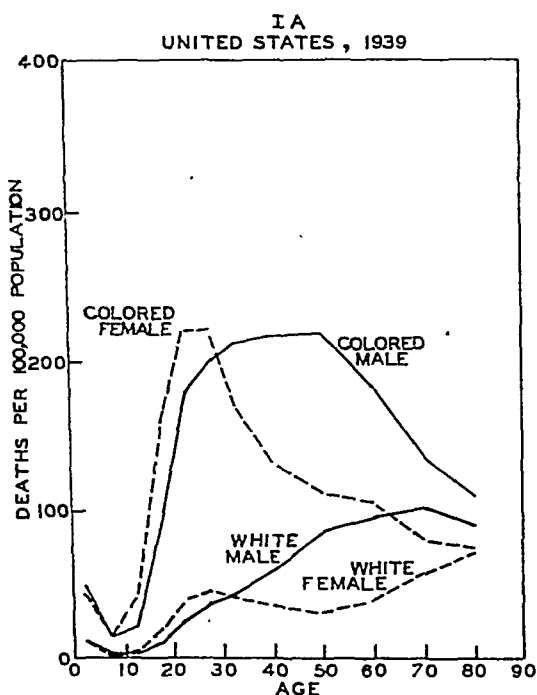
| Age Group | White | | Colored | |
|-------------------|-------|--------|---------|--------|
| | Male | Female | Male | Female |
| Total | 44.7 | 30.6 | 137.2 | 120.9 |
| Under 5 years | 11.5 | 11.2 | 49.6 | 45.4 |
| 5-9 years | 3.3 | 2.8 | 16.4 | 16.1 |
| 10-14 years | 3.2 | 4.9 | 22.1 | 41.4 |
| 15-19 years | 11.6 | 20.4 | 99.2 | 162.3 |
| 20-24 years | 25.3 | 39.5 | 179.8 | 220.9 |
| 25-29 years | 35.4 | 46.1 | 200.3 | 221.9 |
| 30-34 years | 43.7 | 41.7 | 214.2 | 171.5 |
| 35-44 years | 60.1 | 35.3 | 217.2 | 132.9 |
| 45-54 years | 86.8 | 32.2 | 221.8 | 114.2 |
| 55-64 years | 97.5 | 40.8 | 184.3 | 107.4 |
| 65-74 years | 101.1 | 58.6 | 136.7 | 81.3 |
| 75 years and over | 90.7 | 73.1 | 112.0 | 75.2 |

Tennessee colored tuberculosis death rate of 159.3, adjusted to the age distribution of the colored population of the United States, was only 24 per cent higher than the rate of 128.9 for the United States. Therefore, it is evident that the excessive tuberculosis mortality in Tennessee is chiefly in the white population, with a greater excess among females.

To show the age groups of excessive mortality, the death rates have been calculated by age, sex, and color. In Table 1 and Chart I-A are given these rates for the United States.

The white male tuberculosis death rates increased with age to the high rate of 101.1 per 100,000 population for those 65-74 years of age while the female rates were high for young adults 20-34

TUBERCULOSIS DEATH RATES PER 100,000 POPULATION
BY AGE, SEX AND COLOR FOR UNITED STATES AND TENNESSEE



years, followed by a slight decrease for females 35-54 years, with an increase to the rate of 73.1 for females 75 years and over. Among colored males the rates were high for young adults and continued high with a decline for colored males 55 years and over. Very high rates were recorded for young colored females 20-29 years of age followed by lower rates in the older age groups.

The tuberculosis death rates are given in Table 2 and Chart I-B for Tennessee for the 3 year period * 1938-1940.

States, the distributions of these rates, by age, were similar.

On subdivision of these data for Tennessee by urban and rural areas it was found that the white tuberculosis death rate in the rural area was higher than the rate in the urban area, with a marked excess in the older age group. The colored tuberculosis rate, however, was higher in the urban area than in the rural area.⁴

Without doubt the outstanding feature in the comparison of mortality from tuberculosis in Tennessee and the United

TABLE 2

Average Annual Tuberculosis Death Rates per 100,000 Population by Age, Sex and Color for Tennessee, 1938-1940

| Age Group | White | | Colored | |
|-----------------------|-------|--------|---------|--------|
| | Male | Female | Male | Female |
| Total—Crude Rates | 57.8 | 62.2 | 160.9 | 164.8 |
| Total—Adjusted Rates* | 64.7 | 68.4 | 157.4 | 161.2 |
| Under 5 years | 22.4 | 19.4 | 86.6 | 69.3 |
| 5-9 years | 3.9 | 4.8 | 14.2 | 21.3 |
| 10-14 years | 5.1 | 5.8 | 30.3 | 65.6 |
| 15-19 years | 13.1 | 29.3 | 134.7 | 242.2 |
| 20-24 years | 41.3 | 75.5 | 236.7 | 328.0 |
| 25-29 years | 51.0 | 74.2 | 255.6 | 282.5 |
| 30-34 years | 64.8 | 75.6 | 244.1 | 213.9 |
| 35-44 years | 74.4 | 66.7 | 222.1 | 156.7 |
| 45-54 years | 95.9 | 78.8 | 226.1 | 140.1 |
| 55-64 years | 140.7 | 119.6 | 182.7 | 125.0 |
| 65-74 years | 199.4 | 204.2 | 158.9 | 111.3 |
| 75 years and over | 255.5 | 275.6 | 150.7 | 60.3 |

* Adjusted for age distribution of population of United States, 1939

In the white population the death rates for both male and female increased with age and were very high for those 55 years and over. Both male and female death rates were higher in Tennessee than in the United States for young adults and for those in the older age groups. The excessive mortality was greater for white females than for white males. Although the colored male and female death rates were higher in Tennessee than they were in the United

States is the very high rate in Tennessee in the white population in the older age groups, that is, for those 55 years of age and over.

In considering the high tuberculosis death rates in the older age groups in Tennessee the study of the rates in the past would be enlightening. These people dying in the older age groups have no doubt passed through a period when tuberculosis death rates were higher than they are at present. The sizes of such rates are not known since official reporting of deaths on a state-wide basis in Tennessee dates back only to 1914. The late Dr. W. H. Frost made the

* Since the numbers of deaths in the various age groups in Tennessee were small, average rates for the 3 year period, 1938-1940, were obtained.

TABLE 3

*Tuberculosis Deaths with Average Annual Tuberculosis Death Rates per 100,000
Population by Color for Williamson County, Tenn., for 1932-1941*

| | Total | | White | | Colored | |
|-----------|--------|-----------------|--------|-----------------|---------|-----------------|
| | Deaths | Av. Annual Rate | Deaths | Av. Annual Rate | Deaths | Av. Annual Rate |
| Total | 214 | 87.5 | 119 | 62.8 | 95 | 172.4 |
| 1932-1936 | 118 | 98.9 | 63 | 68.4 | 55 | 202.8 |
| 1937-1941 | 96 | 76.7 | 56 | 57.6 | 40 | 142.9 |

following statements⁵ regarding the relatively high mortality rates in the older age groups:

Viewed in this light the relatively high mortality rates now exhibited in the higher age groups seem to me to have a significance quite different from what I had attributed to them. They may be interpreted as the residuum of the much higher rates which the now aged cohorts have experienced in earlier life. In general, the rule seems to be that the higher the mortality of any cohort in early life, the higher will it be in later years. Or, to have passed through a period of high mortality risk confers not protection, but added hazard in late life.

Study of the tuberculosis deaths reported since the beginning of the Williamson County Tuberculosis Study in

During the 10 year period, 1932-1941, 214 tuberculosis deaths have been recorded for Williamson County.* The average tuberculosis death rate for this period was 87.5 per 100,000 population with the colored rate of 172.4 nearly three times the white rate of 62.8.

A slight decrease has been noted in both white and colored death rates as shown in Table 3.

Of the 214 tuberculosis deaths recorded for Williamson County, 140 were deaths of persons followed in the study who were known to have died from tuberculosis, 47 were believed to be tuberculosis deaths upon investigation, 23 were considered deaths from causes

TABLE 4

*Tuberculosis Deaths as Recorded and Additional Tuberculosis Deaths by Color,
Williamson County, Tenn., 1932-1941*

| | Total | White | Colored |
|---|-------|-------|---------|
| Official Tuberculosis Deaths—Total | 214 | 119 | 95 |
| In Study Group—Tuberculosis Deaths | 140 | 80 | 60 |
| Considered Tuberculosis Deaths | 47 | 22 | 25 |
| Considered Non-Tuberculosis Deaths | 23 | 15 | 8 |
| Unknown | 4 | 2 | 2 |
| Additional Tuberculosis Deaths—Total | 33 | 17 | 16 |
| Death Certificates Stated Other Causes | 18 | 7 | 11 |
| No Death Certificate | 8 | 4 | 4 |
| Death Certificates for Other Area or Late | 7 | 6 | 1 |
| Total Considered Tuberculosis Deaths | 220 | 119 | 101 |

December, 1931, especially deaths of patients who were under clinical observation prior to death, should give the best information available to prove or disprove the accuracy of these extremely high rates in the rural population of Tennessee.

other than tuberculosis, and 4 were deaths of persons unknown to the study personnel. The data are shown by color in Table 4.

* Resident data from the *Annual Vital Statistics Bulletins* were used for 1933-1941 and recorded data for 1932.

TABLE 5

*Deaths Considered Caused by Tuberculosis with Average Annual Rates per 100,000
Population by Age, Sex and Color, Williamson County, Tenn., 1932-1941*

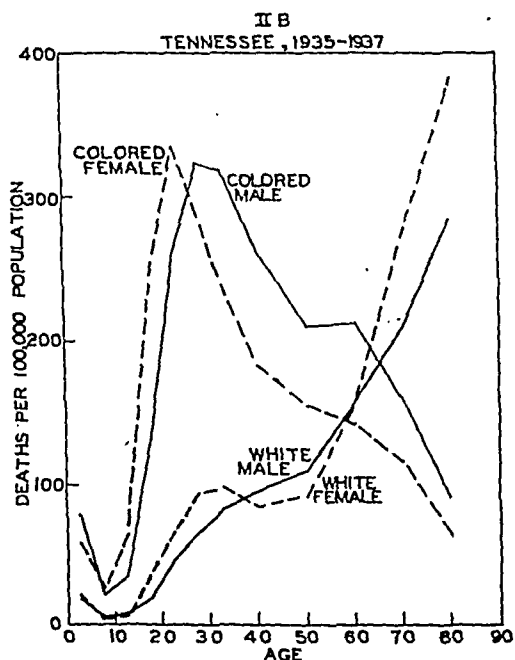
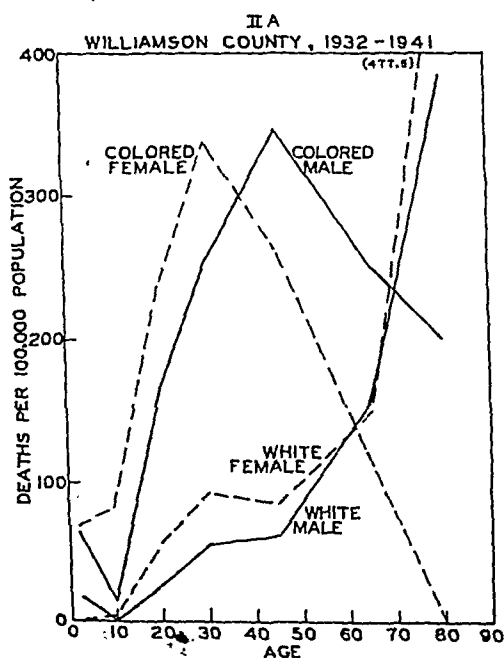
| Age Group | White Male | | White Female | | Colored Male | | Colored Female | |
|-------------------|------------|--------------|--------------|--------------|--------------|--------------|----------------|--------------|
| | Deaths | Average Rate | Deaths | Average Rate | Deaths | Average Rate | Deaths | Average Rate |
| Total | 53 | 55.0 | 66 | 71.0 | 49 | 177.6 | 52 | 188.9 |
| Under 5 years | 2 | 19.6 | .. | .... | 2 | 65.7 | 2 | 69.3 |
| 5-14 years | .. | .... | 1 | 4.9 | 1 | 16.1 | 5 | 81.6 |
| 15-24 years | 5 | 27.4 | 10 | 57.5 | 9 | 163.5 | 13 | 235.9 |
| 25-34 years | 7 | 55.6 | 12 | 92.7 | 10 | 254.5 | 14 | 337.8 |
| 35-54 years | 12 | 62.4 | 17 | 84.9 | 18 | 346.2 | 15 | 262.9 |
| 55-74 years | 20 | 156.8 | 17 | 150.0 | 8 | 250.4 | 3 | 113.0 |
| 75 years and over | 7 | 383.6 | 9 | 477.5 | 1 | 200.0 | .. | .... |

In addition to these 214 deaths recorded as tuberculosis, 33 other patients with active tuberculosis were followed in the study and were known to have died from the disease. The causes of deaths for 18 of these patients were stated to be other than tuberculosis on death certificates, no death certificate was recorded for 8, and death certificates were filed for other areas with the residence stated incorrectly or were filed late for 7. When these additional tuberculosis deaths, 33, were added to the

number of deaths officially recorded as tuberculosis and considered so by the study, 187, the total number of deaths considered caused by tuberculosis was 220. This number is practically the same as the number officially recorded as tuberculosis deaths due to the subtraction of 27 and addition of 33. Thus in considering the number of the tuberculosis deaths in Williamson County, it appears to be approximately the same as the number officially recorded.

These 220 deaths considered caused

TUBERCULOSIS DEATH RATES PER 100,000 POPULATION BY AGE, SEX AND COLOR FOR WILLIAMSON COUNTY AND TENNESSEE



by tuberculosis will be used in the following discussion. The average tuberculosis death rates by age, sex, and color have been calculated to compare with the rates in Tennessee. The data for this 10 year period for Williamson County are given in Table 5.

In Chart II these rates are shown graphically with average data for Tennessee for the 3 year period, 1935-1937, for comparison. With the small number of deaths involved for Williamson County for some of these age groups, the consistency of Williamson County rates with those in Tennessee seems noteworthy. The death rates in the white population in the older age groups are high in Williamson County as they are in Tennessee, with the female death rate higher than the male death rate. Therefore, the tuberculosis death rates by age, sex, and color in Williamson County are found to be essentially in agreement with those in Tennessee.

CLINICAL EVIDENCE

Of the 220 deaths considered attributable to tuberculosis, 173 were of patients followed in the study. The remaining 47 deaths were investigated after death with inquiry regarding symptoms and duration of illness. It is possible, therefore, to give additional data regarding the nature and evidence of the disease for the 173 persons followed in the study.

Diagnoses of tuberculosis have usually

been established by physical and x-ray examinations. Suspected cases of tuberculosis have been referred to the clinic by the private physicians of the county and the diagnoses have been made by the study clinician. Whenever the patient has been too ill to be brought to the clinic an examination has been made in the home. If electric current was available, portable equipment was taken to the home so that the x-ray might be made. In a few cases the clinician has gone to the home with the private physician to examine a very sick patient. Following initial examination, nursing visits and periodic examinations have been made according to the recommendations of the clinician.

In Table 6 are given the numbers of diagnoses established by x-ray examination by age group and color.

Diagnoses of 86 per cent of the white and 92 per cent of the colored cases were established by x-ray examination. Of the 14 white patients without x-ray examination, 10 submitted sputa which were positive. Three of the other 4 had far advanced bilateral tuberculosis and died within a few months after examination. The 4th was a bed patient with moderately advanced tuberculosis and died 2 weeks after examination.

Of the 6 colored patients without x-ray examination 4 had positive sputa and the other 2 had far advanced bilateral tuberculosis, and both died within 1 month after examination.

TABLE 6

Diagnoses Established by X-ray Examination for 173 Patients Dying from Tuberculosis, by Age and Color, Williamson County, Tenn., 1932-1941

| Age Group | White | | | Colored | | |
|-------------------|---|--------|----------|---|--------|----------|
| | Diagnoses Established by X-ray Examination | | | Diagnoses Established by X-ray Examination | | |
| | Total | Number | Per cent | Total | Number | Per cent |
| Total | 97 | 83 | 86 | 76 | 70 | 92 |
| Under 15 years | 3 | 3 | 100 | 9 | 9 | 100 |
| 15-34 years | 32 | 28 | 88 | 36 | 33 | 92 |
| 35-54 years | 24 | 21 | 88 | 24 | 22 | 92 |
| 55 years and over | 38 | 31 | 82 | 7 | 6 | 86 |

The 97 white patients were given 255 x-ray examinations and 51 physical examinations in the home so that they had on the average 3.2 examinations. Each of the 76 colored patients had an average of 2.6 examinations.

In studying duration of the disease, the length of time from onset of the disease as manifest by symptoms to death has been obtained for each patient. The average years from onset of first symptoms to death from the disease according to age and sex of white persons dying from tuberculosis are given in Table 7.

that for white persons. Among the colored, the period from onset to death was 2.3 years for the male and 1.6 for the female. The longer period of time from onset to death for colored males than for females is consistent with the tuberculosis death rates which indicate that males dying from tuberculosis live longer than do females.

Of the 38 white persons in the older age group (55 years and over), 11 were 55-64 years, 18 were 65-74 years, and 9 were 75 years of age or over. It should be pointed out that this large number of old people with the disease

TABLE 7

Average Years from Onset to Death of White Persons Dying from Tuberculosis, by Age Group and Sex, Williamson County, Tenn., 1932-1941

| Age Group | Total | | Male | | Female | |
|-------------------|--------|-----------------------------------|--------|-----------------------------------|--------|-----------------------------------|
| | Number | Average Years from Onset to Death | Number | Average Years from Onset to Death | Number | Average Years from Onset to Death |
| Total | 97 | 8.7 | 43 | 9.0 | 54 | 8.5 |
| Under 15 years | 3 | 1.0 | 2 | 0.4 | 1 | 2.0 |
| 15-34 years | 32 | 2.7 | 11 | 3.1 | 21 | 2.5 |
| 35-54 years | 24 | 9.3 | 10 | 10.6 | 14 | 8.4 |
| 55 years and over | 38 | 14.0 | 20 | 12.4 | 18 | 15.8 |

The average period of time for white persons dying from tuberculosis, that is, from onset to death, was 8.7 years. For those 55 years of age and over, the average period, 14.0 years, was longer than for the younger adults. The length of time from onset to death for colored persons (1.8 years) as shown in Table 8 was approximately one-fifth

over relatively long periods of time may play an important part in keeping the tuberculosis death rates high in Tennessee. These old people have the disease many years and are not sufficiently disabled to be bedridden. Some of them live in several households with sons and daughters and grandchildren. Therefore, over a long period of time

TABLE 8

Average Years from Onset to Death of Colored Persons Dying from Tuberculosis by Age Group and Sex, Williamson County, Tenn., 1932-1941

| Age Group | Total | | Male | | Female | |
|-------------------|--------|-----------------------------------|--------|-----------------------------------|--------|-----------------------------------|
| | Number | Average Years from Onset to Death | Number | Average Years from Onset to Death | Number | Average Years from Onset to Death |
| Total | 76 | 1.8 | 36 | 2.3 | 40 | 1.6 |
| Under 15 years | 9 | 0.5 | 3 | 0.3 | 6 | 0.6 |
| 15-34 years | 36 | 1.2 | 15 | 1.0 | 21 | 1.4 |
| 35-54 years | 24 | 3.0 | 12 | 4.8 | 12 | 1.3 |
| 55 years and over | 7 | 3.5 | 6 | 1.6 | 1 | 15.1 |

the disease may be spread by them to many young people. Some of the young susceptible individuals in contact with parents or grandparents with tubercle bacilli in the sputum break down with the disease and die from tuberculosis while others are resistant and the tuberculous process becomes arrested. Cases of this second type may break down many years later. An example in which the grandmother in the family had chronic tuberculosis with little disability is given as an illustration.

The head of the family, a white male, age 38, with symptoms of tuberculosis, was referred to the study by his private physician. On x-ray examination he was found to have far advanced tuberculosis with tubercle bacilli in the sputum. This man died 2 years and

was also found to have moderately advanced tuberculosis with tubercle bacilli in the sputum and she died one year and one month later. In addition, another son of the grandmother in the family died from tuberculosis in 1913, age 22 years. Thus this old lady lived for many years probably expectorating tubercle bacilli occasionally which, in turn, caused new cases and deaths in the family. These 3 additional cases and deaths occurred in a period of 23 years.

BACTERIOLOGICAL EVIDENCE

Another evidence of tuberculous disease among these patients carried prior to death was obtained through sputum analyses. The results of such examinations are given in Table 9.

TABLE 9

Results of Sputum Analysis for 173 Patients Dying from Tuberculosis by Color and Age, Williamson County, Tenn., 1932-1941

| Age Group | Total | | | | White | | | | Colored | | | |
|-------------------|-------|-------------|-------------|---------|-------|-------------|-------------|---------|---------|-------------|-------------|---------|
| | Total | Sputum Pos. | Sputum Neg. | Unknown | Total | Sputum Pos. | Sputum Neg. | Unknown | Total | Sputum Pos. | Sputum Neg. | Unknown |
| Total | 173 | 132 | 18 | 23 | 97 | 79 | 9 | 9 | 76 | 53 | 9 | 14 |
| Under 15 years | 12 | 4 | 2 | 6 | 3 | 1 | .. | 2 | 9 | 3 | 2 | 4 |
| 15-34 years | 68 | 56 | 5 | 7 | 32 | 30 | 1 | 1 | 36 | 26 | 4 | 6 |
| 35-54 years | 48 | 41 | 2 | 5 | 24 | 22 | .. | 2 | 24 | 19 | 2 | 3 |
| 55 years and over | 45 | 31 | 9 | 5 | 38 | 26 | 8 | 4 | 7 | 5 | 1 | 1 |

5 months later of tuberculosis. On examination of other members of the family, his mother, age 77 years, was found to have far advanced tuberculosis. Tubercle bacilli could not be isolated from the five specimens of her sputum submitted. According to the history obtained, this woman had a prolonged cough for 1 year with expectoration in the morning, about 50 years prior to examination. Although she had symptoms and physical signs of tuberculosis at the time of examination, she was only slightly disabled. She died 3 years and 4 months later from tuberculosis. The daughter of the head of the family who was 14 years of age

Of the 173 patients who died from tuberculosis and were followed in the study, 132, or 76 per cent, were known to have been discharging tubercle bacilli. For all adult age groups, the proportions of these persons found to have tubercle bacilli in the sputum were high and this is confirmatory evidence of tuberculous disease. For 23 patients, specimens could not be obtained and for 18 the specimens submitted were negative for tubercle bacilli.

Some of these persons, with tuberculosis over a long period of time, especially in the higher age groups, were known to have tubercle bacilli in their sputum for many years. An example

of such a case was a white male, 66 years of age on examination, who was found to have far advanced tuberculosis with cavitation. The onset of the disease occurred 3 years prior to examination. His condition remained practically the same for 6 years. Sputum analyses were made on 56 occasions and all were positive. During most of this time he felt well and was able to be up every day. He died from the disease 9 years after onset of first symptoms.

Although 31 of the 45 patients in the older age group (55 years and over) were found to have tubercle bacilli in their sputa, specimens submitted on two or more occasions for 9 were negative. No doubt through examination of additional specimens of these patients, tubercle bacilli would have been isolated for a few.* Of these 9, 8 were white females who were known to have had the disease for 20 years, on the average. Their average age at death was 73 years. Five had far advanced and 4 moderately advanced tuberculosis on x-ray examination and very little disability. Clinical and x-ray examination showed that these people had active disease which caused death. An illustration of this type of case is the grandmother in the white family discussed previously. Only one specimen was obtained at the time of death and four others were obtained 1-4 years prior to death. Examination revealed strand-like infiltration throughout the entire right lung with bronchiectasis in the base, also strand-like infiltration in the circle of the first rib in the left lung with calcium in both lungs. Pulmonary

symptoms became worse for the last few months prior to death and her death was attributed to tuberculosis.

These sputum findings offer additional evidence of the accuracy of the classification of the causes of death as tuberculosis.

SUMMARY

1. The tuberculosis death rates for Tennessee have been compared with those in the United States. The outstanding feature of the difference was the very high rates in Tennessee in the white population in the older age groups, that is, for those 55 years of age and over.

2. During the 10 year period 1932-1941, 214 tuberculosis deaths were recorded in Williamson County. This number of officially recorded deaths appears to be practically the same as the total number of deaths, 220, considered upon investigation as due to tuberculosis.

3. On studying the Williamson County tuberculosis death rates by age, sex, and color, the rates were found to be essentially in agreement with those in Tennessee with high rates in the white population in the older age groups.

4. Diagnoses have usually been established by x-ray, with 86 per cent of the diagnoses of the white and 92 per cent of the colored patients dying from tuberculosis established in this way.

5. The duration of the disease, from onset of first symptoms to death, was 8.7 years for the white patients followed in the study and 1.8 years for the colored patients.

6. For these patients who died from tuberculosis and were carried in the study, 76 per cent were known to have been discharging tubercle bacilli prior to death. This was additional evidence of the accuracy of the classification of the causes of death as tuberculosis.

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* Sputum of one of the females with far advanced tuberculosis who had 10 negative sputum examinations in the study was examined by Dr. B. J. Olson of the National Institute of Health. Although the smear and culture were negative, 1 out of 4 animals inoculated with undigested sputum showed evidence of the disease on autopsy. This sputum was examined 3 months prior to death and 3 months after the last sputum examination in the study.

Prevalence and Incidence of Tuberculosis among Household Associates According to Age and Sex of Index Case*

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THE occurrence of manifest tuberculosis in household associates of sputum-positive or presumably sputum-positive index cases and in associates of cases other than sputum-positive in Williamson County, Tenn., has been previously reported.^{1, 2, 3} In none of these reports was there any division of material according to the sex and age of the index case. It seems likely that these factors are of importance in determining the risk of development of manifest tuberculosis in household associates. The age at which tuberculosis develops may influence the type of disease and the rapidity of its course; these in turn may affect materially the extent and the duration of the exposure to which associates are subjected. Exposure may be affected also by varying intimacy of contact, since, for example, the relationship between young children and their parents is in general closer than between such children and their grandparents.

If the age of the index case is a significant factor, Tennessee data should be of especial interest. From age-specific tuberculosis death rates it has been learned that Tennessee, in the white portion of its population, presents a picture quite different from that of the United States in two respects:

1. In the older ages the rates for Tennessee have been much higher for both sexes.

2. In these older ages the rates for females have been higher than for males while in the United States the rates for males have been higher than for females.

In certain acute diseases there are peculiarities of secondary attack rates which may be attributable to the age of the primary case. In diphtheria, for example, studies of familial incidence show higher attack rates among adolescent and younger adult females than among males of comparable ages.⁴

It should be remembered that the index case is not necessarily the first case in the household. Not infrequently cases found as a result of examination of household associates give histories of onset of illness which antedate that of the index cases, sometimes by many years. Usually, however, the index case is the first recognized case in the household.

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Acknowledgment is made of the valuable suggestions made by Dr. J. A. Doull in the preparation of this report.

With these facts in mind prevalence and incidence of tuberculous lesions have been studied according to the age and sex distribution both of index cases and of household associates. The practical questions on which it is hoped eventually to throw light may be expressed as follows: (a) Does age and sex of the index case affect the prevalence of tuberculosis among household associates at the time the household comes to the attention of the health department? (b) Does age and sex of the index case affect significantly the incidence of tuberculosis among household associates in subsequent years?

NUMBERS OF INDEX CASES AND ASSOCIATES

From the beginning of the intensive study of tuberculosis in Williamson County late in 1931 through December 31, 1940, 536 white individuals with some form of reinfection tuberculosis have been designated as index cases in white households. These 536 white index cases and their household associates form the basis for the present analysis. A diagnosis of manifest tuberculosis is based upon evidence of tuberculosis recognizable by history or physical examination. The cases of manifest tuberculosis have been divided in two groups:

1. "Sputum-positive," including those with tubercle bacilli demonstrated on two or more occasions by staining untreated sputum, those fatal before investigation and those with insufficient or no sputum analysis dying shortly after observation was commenced.

2. "Other manifest," including those sputum-negative on two or more examinations, and those with insufficient or no sputum analysis not falling in the first group with respect to death.

Those with apical lesions demonstrable by x-ray, but without associated physical signs, symptoms, or history which would lead to the diagnosis of tuberculosis in the absence of x-ray examination were classed as "latent apical."

In the classification of findings in household associates, the same criteria have been used as for the index cases. Those with no evidence of reinfection tuberculosis have been classed in two groups:

1. Primary tuberculosis, including those who, on x-ray examination, show nothing more than a lesion of the primary or first infection type, with no signs or symptoms of tuberculous disease.

2. Negative, including those who, on physical and x-ray examination show no signs of tuberculosis, but not necessarily a negative tuberculin reaction.

The distribution of index cases by type, sex and broad age groups is shown in Table 1.

Of 536 index cases, 322, or 60 per cent, were females. For all types, this excess of females was most striking in those under 35 years of age, but it is evident also in those of 35 to 54 years of age. In the oldest age group, 55 years and over, the numbers of males and females are approximately equal. It is of special interest that of 46

TABLE 1
Index Cases by Age, Sex and Type

| | Total | | | Sputum- Positive and Fatal | | | Other Manifest | | | Latent Apical | | |
|-------------------|-------|------|--------|-------------------------------|------|--------|-------------------|------|--------|------------------|------|--------|
| | Total | Male | Female | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| Total | 536 | 214 | 322 | 138 | 60 | 78 | 316 | 122 | 194 | 82 | 32 | 50 |
| Under 35 years | 157 | 45 | 112 | 57 | 17 | 40 | 76 | 20 | 56 | 24 | 8 | 16 |
| 35-54 years | 203 | 80 | 123 | 35 | 13 | 22 | 128 | 53 | 75 | 40 | 14 | 26 |
| 55 years and over | 176 | 89 | 87 | 46 | 30 | 16 | 112 | 49 | 63 | 18 | 10 | 8 |

sputum-positive or fatal index cases in persons 55 years of age and over, 30, or 65 per cent, were males.

The higher mortality among females in the older ages has already been mentioned. This has been a feature of

with those cases found as the result of examination of household associates of index cases. There were 74 manifest cases and 63 latent apical cases of tuberculosis in the latter group and the comparison is shown in Table 2.

TABLE 2
Index Cases and Other Cases Found on Investigation by Age and Sex

| | Manifest | | | | | | Latent Apical | | | | | |
|--------------------|-------------|-------------|-------------|-------------|-------------|-------------|---------------|-------------|-------------|-------------|-------------|-------------|
| | Total | | Male | | Female | | Total | | Male | | Female | |
| | Num- ber | Per cent | Num- ber | Per cent | Num- ber | Per cent | Num- ber | Per cent | Num- ber | Per cent | Num- ber | Per cent |
| <i>Index Cases</i> | | | | | | | | | | | | |
| Total | 454 | 100.0 | 182 | 100.0 | 272 | 100.0 | 82 | 100.1 | 32 | 100.0 | 50 | 100.0 |
| Under 35 years | 133 | 29.3 | 37 | 20.3 | 96 | 35.3 | 24 | 29.3 | 8 | 25.0 | 16 | 32.0 |
| 35-54 years | 163 | 35.9 | 66 | 36.3 | 97 | 35.7 | 40 | 48.8 | 14 | 43.8 | 26 | 52.0 |
| 55 years and over | 158 | 34.8 | 79 | 43.4 | 79 | 29.0 | 18 | 22.0 | 10 | 31.2 | 8 | 16.0 |
| <i>Other Cases</i> | | | | | | | | | | | | |
| Total | 74 | 100.0 | 30 | 100.0 | 44 | 100.0 | 63 | 100.0 | 29 | 99.9 | 34 | 100.0 |
| Under 35 years | 16 | 21.6 | 7 | 23.3 | 9 | 20.5 | 23 | 36.5 | 11 | 37.9 | 12 | 35.3 |
| 35-54 years | 25 | 33.8 | 8 | 26.7 | 17 | 38.6 | 30 | 47.6 | 13 | 44.8 | 17 | 50.0 |
| 55 years and over | 33 | 44.6 | 15 | 50.0 | 18 | 40.9 | 10 | 15.9 | 5 | 17.2 | 5 | 14.7 |

tuberculosis mortality of this state in every year since data have become available but this disparity between the sexes has not been so apparent in recent years. At ages under 35 years, the death rates for females have continued to remain substantially higher than those for males. This is, however, an almost universal feature of mortality from tuberculosis. In Tennessee as a whole, judging from response to the field diagnostic service of the Division of Tuberculosis Control, females are more likely to report to physicians or clinics for chest examination and to report sooner after appearance of symptoms than males. Males are more apt to disregard symptoms and delay examination. It is, therefore, not surprising to find an excess of females among index cases in Williamson County.

SEX AND AGE DISTRIBUTION OF INDEX CASES AND OF CASES FOUND AMONG HOUSEHOLD ASSOCIATES

It is of some interest to compare the sex and age distribution of index cases

These added cases of manifest tuberculosis had a slightly greater proportion in the age group 55 years or over than the index cases. The added latent apical cases had a somewhat different age distribution, with proportionately a larger number at ages less than 35 years.

The sex distribution of these added cases was quite similar to that of the index cases, 57 per cent being females.

PREVALENCE OF TUBERCULOSIS IN HOUSEHOLD ASSOCIATES

In Williamson County, as in the state as a whole, it has been possible to examine a larger proportion of female household associates than of male associates. For a variety of reasons females report to the family physicians or to the clinic more promptly and, in a greater proportion of instances, after an examination has been recommended than do males. A difference in the sense of economic pressure is probably of importance, and it is also likely that nurses are able to impress on females the advisability of examination to a

greater extent because most of the home conversations of the nurse are with the females of the household. The approach of the nurse is, therefore, more likely to be direct in dealing with females than is the case with males.

In determining the prevalence of tuberculous lesions among household associates according to type, sex, and age of the index case an adjustment for age was found to be advisable. The prevalence rates of tuberculous lesions shown in Tables 3 and 4 have been adjusted to the age distribution of all household associates.

Prevalence according to age of index case—Table 3 shows the prevalence of tuberculous lesions by sex among household associates according to age group and classification of the index case. Among household associates of sputum-positive index cases no significant variation in prevalence of manifest disease was associated with differences in age. For associates of index cases under 55 years of age the prevalence rate was 6.7 per cent, and for associates of older index cases it was 6.3 per cent. For the other than sputum-positive group there was an apparently higher rate, 3.3 per cent, when the index cases were under 55 years of age, than when they

were older, 1.2 per cent, but the difference may have been a fortuitous one.

Of male associates of sputum-positive cases under 55 years of age, 6.4 per cent were found to have manifest tuberculosis, and of the comparable female associates, 7.2 per cent. A wider difference, however, was found among associates of this type of index case older than 55 years. Of the males the proportion found to have manifest tuberculosis was 2.4 per cent and of the females, 8.7 per cent. From this it is suggested that, among associates of older index cases of the sputum-positive class, tuberculosis was much more frequently found in females than in males, whereas in the households of younger index cases, there was little difference between the prevalence rates for males and females.

This higher proportion of females showing manifest tuberculosis was seen also in household associates of the older index cases other than sputum-positive. The proportion of male associates of this type of index case under 55 years of age found to have manifest tuberculosis was 3.0 per cent, and for females the proportion was 3.7 per cent. Among associates of this type of index case 55 years of age or over, 0.3 per cent of

TABLE 3

Prevalence of Tuberculosis of Various Types by Sex Among Household Associates According to Age Group and Classification of Index Case*

| | Total | | | Index Case Under 55 Years | | | Index Case 55 Years and Over | | |
|---|-------|-------|--------|------------------------------|-------|--------|---------------------------------|-------|--------|
| | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| <i>Associates of Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 100.0 | 99.9 | 100.1 | 100.1 | 100.0 | 100.0 | 100.1 | 99.9 | 100.1 |
| Manifest | 6.6 | 5.1 | 8.2 | 6.7 | 6.4 | 7.2 | 6.3 | 2.4 | 8.7 |
| Latent Apical | 7.9 | 8.9 | 6.9 | 6.3 | 7.8 | 4.9 | 11.4 | 10.8 | 12.5 |
| Primary | 65.8 | 61.0 | 70.7 | 70.2 | 66.0 | 74.8 | 55.2 | 47.7 | 62.8 |
| Negative | 19.7 | 24.9 | 14.2 | 16.9 | 19.8 | 13.1 | 27.2 | 39.0 | 16.1 |
| <i>Associates of Other Than Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.1 |
| Manifest | 2.4 | 2.0 | 3.0 | 3.3 | 3.0 | 3.7 | 1.2 | 0.3 | 1.9 |
| Latent Apical | 7.4 | 6.6 | 8.5 | 8.1 | 7.4 | 8.9 | 7.4 | 3.6 | 8.3 |
| Primary | 57.3 | 56.3 | 57.7 | 58.0 | 59.3 | 57.5 | 53.2 | 49.8 | 56.6 |
| Negative | 32.9 | 35.1 | 30.8 | 30.6 | 30.3 | 29.9 | 38.3 | 46.3 | 33.3 |

* Adjusted to age distribution of all household associates

TABLE 4

Prevalence of Tuberculosis of Various Types by Sex Among Household Associates According to Sex and Classification of Index Case*

| | Total | | | Index Case Male † | | | Index Case Female † | | |
|---|-------|-------|--------|----------------------|-------|--------|------------------------|-------|--------|
| | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| <i>Associates of Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| Manifest | 6.6 | 5.1 | 8.2 | 8.5 | 7.5 | 9.7 | 5.1 | 3.4 | 6.5 |
| Latent Apical | 7.9 | 8.9 | 6.9 | 8.5 | 8.9 | 8.6 | 7.2 | 9.1 | 5.4 |
| Primary | 65.8 | 61.0 | 70.7 | 62.6 | 59.9 | 67.2 | 67.9 | 58.6 | 76.6 |
| Negative | 19.7 | 24.9 | 14.2 | 20.4 | 23.7 | 14.5 | 19.8 | 28.9 | 11.6 |
| <i>Associates of Other Than Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 |
| Manifest | 2.4 | 2.0 | 3.0 | 2.2 | 2.6 | 2.5 | 2.5 | 2.0 | 4.1 |
| Latent Apical | 7.4 | 6.6 | 8.5 | 7.8 | 10.2 | 6.9 | 7.0 | 5.3 | 9.7 |
| Primary | 57.3 | 56.3 | 57.7 | 57.6 | 57.2 | 58.2 | 57.0 | 58.0 | 55.5 |
| Negative | 32.9 | 35.1 | 30.8 | 32.4 | 30.1 | 32.4 | 33.5 | 34.7 | 30.7 |

* Adjusted to age distribution of all household associates.

† Average age of male sputum-positive index cases is 51 ± 19 , female 39 ± 17 ; average age of male other than sputum-positive index cases is 48 ± 16 , female 44 ± 16 .

males, and 1.9 per cent of females were found to have manifest tuberculosis.

The proportions of associates found to be negative for any type of tuberculous lesion on x-ray examination when compared by sex are the reverse of those noted to have manifest tuberculosis. In each class a smaller proportion of females was negative.

Although prevalence rates of manifest tuberculosis were approximately the same in the two groups of associates of sputum-positive index cases when comparison is made by age of the index case, the proportion of associates of the older index cases with no evidence of tuberculous infection was higher than for associates of index cases of younger ages (27.2 per cent and 16.9 per cent). This difference may be attributable to lesser intimacy of contact between older cases and others in the household, especially children.

Prevalence according to sex of index case—The prevalence of tuberculosis lesions of various types among associates according to type and sex of the index case is shown in Table 4.

In the sputum-positive type, the associates of male index cases had an appar-

ently higher prevalence rate (8.5 per cent) than had associates of female index cases (5.1 per cent). The associates of other than sputum-positive index cases showed no significant difference related to the sex of the index case. Also the proportions escaping infection, as judged from x-ray examinations, were approximately the same regardless of the sex of the index case.

It is also of interest that when the index case was male the prevalence rate for males (7.5 per cent) was not widely different from that for females (9.7 per cent). But when the index case was female the rate for males (3.4 per cent) was lower than that for females (6.5 per cent).

INCIDENCE OF NEW CASES OF TUBERCULOSIS

The incidence of new cases, by sex, during the period of observation, is shown in Tables 5 and 6.

Incidence according to age of index case—The first division of the material is according to type and age of the index case and is given in Table 5. Among household associates of sputum-positive index cases under 55 years of age the

TABLE 5

New Cases of Tuberculosis by Sex with Rates per 1,000 Among Household Associates According to Age Group and Classification of Index Case

| | Total | | | Male | | | Female | | |
|---|--------------|--------|------|--------------|--------|------|--------------|--------|------|
| | New Cases | | | New Cases | | | New Cases | | |
| | Person-Years | Number | Rate | Person-Years | Number | Rate | Person-Years | Number | Rate |
| <i>Associates of Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 2,364.75 | 18 | 7.6 | 1,235.75 | 9 | 7.3 | 1,129.00 | 9 | 8.0 |
| Index Cases under 55 years | 1,644.75 | 15 | 9.1 | 905.50 | 8 | 8.8 | 739.25 | 7 | 9.5 |
| Index Cases 55 years and over | 720.00 | 3 | 4.2 | 330.25 | 1 | 3.0 | 389.75 | 2 | 5.1 |
| <i>Associates of Other Than Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 7,122.00 | 17 | 2.4 | 3,885.50 | 8 | 2.1 | 3,236.50 | 9 | 2.8 |
| Index Cases under 55 years | 5,100.50 | 16 | 3.1 | 2,804.75 | 8 | 2.9 | 2,295.75 | 8 | 3.5 |
| Index Cases 55 years and over | 2,021.50 | 1 | 0.5 | 1,080.75 | .. | ... | 940.75 | 1 | 1.1 |

incidence rate was 9.1 per 1,000 during the period of observation, while in associates of this type of index case of 55 years and over, only 4.2 per 1,000 developed manifest tuberculosis. Corresponding rates for associates of cases other than sputum-positive were 3.1 and 0.5. The numbers of cases in certain of the classes are small but it is of interest that the difference is in the same direction for associates of both classes of index cases, namely toward more tuberculosis in the households of younger index cases. If the risk is actually greater when the index case is younger, however, significant differences in prevalence as well as incidence would be expected. Final judgment on this question, therefore, must await a larger experience.

Incidence according to sex of index case—The material has been divided also by type and sex of the index case and the respective attack rates are given in Table 6.

Associates of female index cases had noticeably higher incidence rates than associates of male index cases. Among associates of sputum-positive index cases the incidence rate for associates of male index cases was 3.0 per 1,000 and for associates of female index cases 11.1 per 1,000. Associates of index cases other than sputum-positive had lower incidence rates; for associates of male index cases the rate was 1.2 per 1,000 and for associates of female cases it was 2.8 per 1,000. In each class of index case the highest incidence rate was noted in female associates of

TABLE 6

New Cases of Tuberculosis by Sex with Rates per 1,000 Among Household Associates According to Sex and Classification of Index Case

| | Total | | | Male | | | Female | | |
|---|--------------|--------|------|--------------|--------|------|--------------|--------|------|
| | New Cases | | | New Cases | | | New Cases | | |
| | Person-Years | Number | Rate | Person-Years | Number | Rate | Person-Years | Number | Rate |
| <i>Associates of Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 2,364.75 | 18 | 7.6 | 1,235.75 | 9 | 7.3 | 1,129.00 | 9 | 8.0 |
| Male Index Case | 1,010.25 | 3 | 3.0 | 440.75 | 2 | 4.5 | 569.50 | 1 | 1.8 |
| Female Index Case | 1,354.50 | 15 | 11.1 | 795.00 | 7 | 8.8 | 559.50 | 8 | 14.3 |
| <i>Associates of Other Than Sputum-Positive Index Cases</i> | | | | | | | | | |
| Total | 7,122.00 | 17 | 2.4 | 3,885.50 | 8 | 2.1 | 3,236.50 | 9 | 2.8 |
| Male Index Case | 2,707.50 | 5 | 1.8 | 1,162.25 | 2 | 1.7 | 1,545.25 | 3 | 1.9 |
| Female Index Case | 4,414.50 | 12 | 2.7 | 2,723.25 | 6 | 2.2 | 1,691.25 | 6 | 3.5 |

female index cases, this rate being 14.3 per 1,000 for female associates of female sputum-positive index cases. The next highest rate 8.8 per 1,000 was observed in male associates of female sputum-positive index cases. Caution must again be observed since it is not clear why a significant difference in incidence would not be reflected in higher prevalence among associates of female index cases.

There is, however, a suggestion that the risk of developing tuberculosis may be higher where associates are exposed to index cases under 55 years of age than when the index cases are older. Also it is suggested that the risk is greater for associates of female index cases than for associates of male index cases. Unfortunately the problem has certain complications which available material cannot resolve. In the sputum-positive class the average age of female index cases was 39 years, that of male 51 years; and in the other than sputum-positive, the respective averages were 44 years and 48 years. Thus, if there is a significant factor it may be either the age or the sex of the index case, or possibly both.

A second complication in interpretation is that neither the age nor the sex of the index case was closely related to variations in prevalence of manifest tuberculosis among household associates.

It is of interest that, regardless of the type, age, or sex of the index case, prevalence and incidence rates were higher for female than for male associates. This may be interpreted as reflecting a closer relationship between females in the household and the patient, or on the other hand it may reflect greater susceptibility of female

associates. The finding of higher prevalence among females than males when the index cases were over 55 years of age but a smaller excess when index cases were younger is in need of confirmation. If true, the explanation may indeed be more continuous association of females with tuberculous patients, that is, greater exposure of female associates.

SUMMARY

1. Prevalence and incidence of tuberculosis morbidity in household associates, by sex, have been determined for different classes of index cases according to age and sex of the index cases.

2. Among index cases, females were more numerous than males. This was also true for those cases found as the result of examination of household contacts.

3. Among household associates a higher proportion of females was found to have manifest tuberculosis, and a smaller proportion of females escaped tuberculous infection.

4. Prevalence and incidence rates were somewhat higher among associates of index cases under 55 years of age than among associates of index cases 55 years of age or over.

5. The risk of development of manifest tuberculosis appeared to be greater among associates of female index cases and this risk seemed to be greater in female than in male associates. Available data are, however, too limited to allow a final judgment on the importance of sex of the index case. Such judgment must await accumulation of a larger body of data.

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Simplification of Laboratory Control Procedures for Market Milk*

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THE effort to simplify the procedures used to determine the quality of market milk has gone on continuously for many years. It has, nevertheless, received an added stimulus because of the present war emergency. Laboratory men have made real progress in the development of simplified tests during the past few years, and can apparently point with pride to results accomplished. Milk sanitarians who have tried to hold milk inspection procedures to essentials without unnecessary duplications in farm and milk plant inspections can also feel that progress has been made although the dairy farmer and the industry are still plagued with a multiplicity of inspections and inspectors. Too frequently regulations are of a type that specifies that construction of barns, milk houses, etc., and cleaning, sterilizing, or other procedures must be carried out in a specific way, whereas the primary function of the inspector should be to see that the consumer receives clean, fresh, safe milk. Both the farmer and the milk plant men frequently know methods of producing milk that meets the standards fixed that are more practical than are the methods specified in regulations; or at least can learn them from agricultural extension agencies, maintained to bring

them the latest and best information in the agricultural field.

Reliance should be placed on tests applied to milk itself, and these tests should be of a type that can be applied before the milk is used. If they can be used by the field, rather than by the laboratory workers, so much the better. Where quality is found to be wanting, the results secured should direct the corrective procedures.

It is not possible to discuss all possible approaches to this problem in the brief time at our disposal, and this paper will be limited to a discussion of methods that seem to be giving good results.

The American Public Health Association Report on Standard Methods for the Examination of Dairy Products offers a wide choice in analytical procedures for determining the quality of milk, both as delivered at receiving stations and as delivered to the consumer. From this report, it is possible to make selections that are suitable for use under widely different local conditions.

METHODS USEFUL IN CONTROLLING THE QUALITY OF RAW MILK AS DELIVERED FOR PASTEURIZATION

Procedures that permit poor quality milk to be recognized and rejected before it is mixed with other milk are the best ones to use at this point. No test has been developed that permits as rapid recognition of poor quality milk as the odor test applied by smelling the inside of the cover as the can is opened

* *Journal Paper No. 546*, Jan. 26, 1943, New York State Experiment Station, Geneva, N. Y. Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

to dump the milk into the weigh vat. This in itself requires no laboratory equipment and the odor can be determined by the trained person as rapidly as the cans can be opened and dumped. Only those who have had experience with it, will realize how effective this time tested and simple procedure can be made. The method has been used by the industry itself ever since milk dealers began to buy milk from producers, but it had never been tried on a large scale by dairy inspectors until a system of deck inspection based on the odor test was put in widespread use in the New York City milk shed in 1937. The odor test is supplemented in this work by an examination with a strainer dipper to detect sediment and flaky milk.

In this discussion of the results secured in this deck inspection control, I shall draw freely on a recent report of this work by R. L. Furnia of the New York City Milk Inspection group.* In 1937, the New York City group of Inspectors put into use the training they had secured in several conferences held at the Experiment Station at Geneva, at the College of Agriculture at Ithaca, in New York City milk plants, and elsewhere. At these conferences, the men who were to do the work had had opportunity to examine cans of milk with known defects in quality until they became confident that they could recognize milk that showed marked defects in quality.

During 1937 these inspectors examined 1,082,497 cans of milk on the receiving platform, rejecting 20,397 cans (1.9 per cent) as unfit for use. Operators of milk plants rejected many more, the figures given including the cans examined by the city inspectors only. The three main causes for rejection were: improper cooling 52 per cent, dirty utensils 16 per cent, and mastitis milk

10 per cent. This work was found to be so valuable that it has been continued.

In 1941, the city inspectors examined 1,341,679 cans of milk on receiving platforms, and rejected 19,260 cans (1.43 per cent). The causes for these rejections were listed as improper cooling 28 per cent, dirty utensils 33 per cent, mastitis milk 14.5 per cent. Because the factors that produce poor quality milk are many and varied, it is not worth while to speculate on the reasons for differences in the results secured.

When a can of milk is rejected, the procedure followed by the New York City Inspection group is to attach a red tag to the can and to check the cause of the rejection on the tag. This can be done readily when the milk is rejected because it is dirty (visible dirt on the strainer dipper), flaky, too warm, or because of odors. However, if the "odor" has caused the rejection, it is necessary to check results by making a direct microscopic examination to determine whether the odor is due to feed or weed odors (ensilage, molasses, wild onions, cabbage, turnips, etc.), to souring of the milk, or to mastitis. All of these things cause readily recognizable odors and the inspector who checks his findings with a microscope soon becomes remarkably accurate in detecting the cause of the odors. In a recent series of 100 cans rejected for bacterial odors, 16 contained the mastitis streptococcus and leucocytes in excessive numbers. The odor of such milk is recognizable and this type of milk represents the most objectionable type of milk received. While it is usually true that the streptococcus found is of the bovine type, in rare cases this may be of the human hemolytic type and capable of causing a virulent septic sore throat or scarlet fever epidemic.

Occasionally the bacteria found may be of the food poisoning staphylococcus type. This was well illustrated by what

* Furnia, R. L. Causes and Reasons for Rejected Milk. 16th Ann. Rep., New York State Assoc. Milk Sanitarians, Sept. 24, 1942.

happened in May, 1942, in the home of a dairyman near Geneva. A can of milk rejected by a New York City Inspector for a bacterial odor was left to stand for 24 hours without refrigeration. Then the cream was removed and used for making homemade ice cream. All of the four children and one adult who partook of the ice cream suffered from typical staphylococcus food poisoning, and examination of the cream showed these organisms to be present.

On another occasion, a prominent dairyman from the same area brought me a sample from a can of rejected milk. He was angry because, as he told me, the inspector had picked only one can as bad out of the 16 sent to the receiving station. All of the cans had been handled in the same way and he was confident that if 15 cans were good, all were good. However, when the milk was examined under the microscope, it was full of mastitis streptococci and the reason for its rejection was obvious. As there was but one cow with a bad quarter, the reason for the rejection of one can only was also evident. Probably a more careful examination on the platform would have revealed a second can that should have been rejected.

While it is not claimed that the rough tests used on the platform with great rapidity yield results that are 100 per cent accurate, a good inspector does not reject milk that ought not to be rejected. He may miss some poor quality milk, but the farmer who tries to get by with careless methods is sure to be caught and caught promptly when the platform inspection is carried out frequently. Skill in this work can be developed readily by any person with a normal sense of smell.

At smaller pasteurizing plants it may be possible to take samples for microscopic examination from each can of milk. This is the procedure followed at the two small plants in Geneva, N. Y. If cans of poor quality milk are found,

an inspection with microscopic examination of the milk is made on the receiving platform the following morning of the milk from the farm that sent the bad milk the previous day. Bad cans of milk are then returned to the dairyman.

I am told that an adaptation of the platform type of inspection based on a preliminary test with methylene blue, with subsequent microscopic examination of rejected milk, is being tried in California at the present time. Such adaptations are practical and bring results that are effective in correcting bad conditions.

PROCEDURES USED IN JUDGING QUALITY OF BOTTLED PASTEURIZED MILK

I shall not need to take up a discussion of the simplified procedures now in use in many places for judging the quality of bottled, pasteurized milk as W. D. Tiedeman, of the New York State Department of Health, one of the pioneers in the use of the phosphatase test, coliform technic, and microscopic examination system for the control of bottled pasteurized milk, is to discuss his experience with these three tests later in this session. Likewise, Dr. Friend Lee Mickle, our presiding officer today, is to discuss his experience in Connecticut with the same "Three Test System" as he has christened it in a paper to be given before the International Association of Milk Sanitarians.

As shown by Burgwald (*J. Dairy Sci.*, 25:1942, 285-291) public health workers generally have found the short New York City phosphatase technic the most satisfactory phosphatase test for use, as it gives results quickly enough to make it possible to place an embargo on milk before use. However, the best evidence indicates that results from any of the four phosphatase technics described in the Appendix to the 8th edition of *Standard Methods for the Examination of Dairy Products* can be depended upon to yield sufficiently accurate results to

be usable. Results secured with these technics duplicate each other excellently where used for checking the pasteurization of milk heated to 143° F. for 30 minutes. Adjustments must be made in standards where higher or lower pasteurization temperatures are in use.

There is good reason for preferring the sodium formate ricinoleate broth test where examinations are to be made of pasteurized milk for bacteria of the coliform-dysentery-typhoid group. Positive results secured from this test should not be regarded as necessarily indicating the presence of coliform bacteria only, because bacteria belonging in the genera *Serratia*, *Proteus*, and *Salmonella* may also ferment formates with the production of visible gas. However, properly pasteurized milk ought not to contain viable organisms belonging to any of these genera in 1 ml. quantities as the milk leaves the pasteurizer.

It is not necessary to use 5 tubes for each of three dilutions, except where it is desired to determine the number of organisms present that will ferment formates with the production of visible gas with a fair degree of exactness. A test of 15 samples made from 1 ml. quantities in 15 different tubes will give more information about a given milk supply than a test made with 15 tubes prepared from one sample. In our experience, when pasteurized milk is contaminated during the bottling process, the contamination is normally bad enough to give positives in all 1 ml. quantities tested. The chief thing to remember in making coliform tests is that, in order to make results significant, samples must be taken at the pasteurizing plant and they must be tested *at once*. Coliform organisms grow so readily in milk that results secured from testing samples of milk that have stood longer than 2 or 3 hours after taking

are always open to question. Likewise bottled milk should be tested within 2 or 3 hours after it is bottled.

Some further experience is needed, before the standard that should be used where direct microscopic counts are made of the number of clumps of bacteria found in pasteurized milk can be fixed. It is clear that practically all of the bacteria killed during pasteurization lose their staining power or disappear completely during pasteurization. The bacteria found in stainable condition in pasteurized milk consist normally of (1) those bacteria that are heat resistant enough to persist through the pasteurization, (2) thermophilic bacteria that may have grown during preheating, filtering, in the foam, or elsewhere, and (3) bacteria added from the utensils with which the milk comes in contact during the bottling process. If the milk stands 24 hours before delivery, growth may also cause an increase in the number of living bacteria present. These problems are discussed by Walter D. Tiedeman.

CONCLUSIONS

In closing, I should like to emphasize again the desirability of basing the entire milk control program on tests of a type that can be applied by the inspector on the spot with subsequent rejection or embargo placed on the milk before use. This sort of a program is possible with the laboratory tests now available *provided* trained and competent inspectors are available. In many cases it may be necessary to carry out laboratory tests for the sake of records or to support actions that may be questioned in court, but it is clear that the best control work is now being done by persons trained and equipped to make tests of milk quality on the spot where the sample is taken.

Laboratory Control of Milk under War Conditions*

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WITHIN the time allotted I should like to touch briefly on several phases of the influence of the war on milk control.

1. MILK LABORATORY SURVEYS IN WAR AREAS

During the past year Dr. L. A. Black, a bacteriologist of the U. S. Public Health Service, has been making surveys of milk laboratories in defense areas throughout the country to determine whether equipment and procedures employed in bacteriological examinations are in conformity with the *Standard Methods for the Examination of Dairy Products*, and to suggest improvements toward that goal. Uniformity of laboratory technics is considered particularly desirable at this time because the new and sudden concentrations of troops and civilians have brought about a considerable increase in the importation of milk from other milk sheds. It is not the purpose of these surveys to find fault but to be constructively helpful. Laboratories are visited only upon invitation of the state health departments, and survey reports with recommendations are forwarded to the states, with a duplicate copy for the laboratory in question.

To date nearly 300 laboratories have

been surveyed in 39 states, and the first round of surveys will probably be completed within the next few months. In the early surveys the form used was based on the seventh edition of *Standard Methods*, but for the later ones the survey form was revised in accordance with the eighth edition. The form covers details of the bacterial plate counts, the direct microscopic count, the reductase tests, and miscellaneous information, and provides spaces for indicating departures from *Standard Methods*. It should be of value to any laboratory for checking its own technics.

During the survey of each laboratory, observations were made of the equipment, the general preparation and sterilization of material, and of the technics used in the analyses. Correct procedures were demonstrated and suggested, and blank copies of the forms left as a guide. Numerous consultations have been held with municipal, state, Army and Navy officials in the interest of increasing the dependability and accuracy of the results of the bacteriological examination of milk. Many Army Service Command laboratories have been visited, and the directors of these laboratories acquainted with the form being used. The Army has requested permission to reproduce the forms for the use of its laboratories. In many of the states it has been possible to familiarize someone in an official

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

capacity with the details of the required procedures, so that they might consult with the local laboratories in case of need.

It is not my intention to present here the results of the surveys, as these will be available to those who are interested through a paper to be presented by Dr. Black before this Annual Meeting. At this time I wish to highlight two or three conclusions, as follows:

1. Many of the Standard Methods requirements are not being followed. For example, the average milk laboratory in the first 26 states surveyed complied fully with not more than half of the 25 main items into which the plate count Standard Methods were divided.

2. The survey indicates the need for an adequate system of state approval or licensing of bacteriological milk laboratories. The type of approval now practised in a few states is nominal or based on equipment only, and therefore gives a false sense of security.

3. Consideration should be given to those requirements of Standard Methods which are frequently violated, with a view to revising or deleting those that do not contribute substantially to the reliability of the results.

Plans are being made for continuing the surveys after the completion of the first round, in order to determine the extent of improvement in equipment and procedures. On the second round it is hoped to visit additional laboratories not previously surveyed, and to spend more time at each than was possible on the first round.

2. REVISED ARMY MILK SPECIFICATIONS

Heretofore the Army specifications for Type III pasteurized milk have included rather meager standards for producing farms and no bacterial standard for the milk prior to pasteurization. Type III pasteurized milk is purchased when neither Type II No. 1 nor Type

II No. 2 is available. The production standards for this type of milk have been raised in the revised tentative U. S. Army specifications set forth in the Quartermaster General's *Circular Letter* 377, dated October 5, 1942. The new paragraph reads as follows:

Raw milk for the production of Type III pasteurized milk shall, upon delivery to the pasteurization plant, have an average bacterial plate count of not to exceed 1,000,000 per cc., or a comparable direct microscopic count, or an average reduction time of not less than $3\frac{1}{2}$ hours. It shall be produced on premises on which buildings, installations, equipment, water supply, facilities, methods and procedures incident to the production, handling, storage and transportation of raw milk are such as to assure that there is delivered to the pasteurizing plant a wholesome milk.

While these revised standards leave much to the judgment of Army veterinary inspectors, they reflect the recognition by Army authorities of the need for farm sanitation and farm inspection even for the lowest grade of pasteurized milk acceptable for Army use.

3. NEED FOR BETTER CONTROL OF THE PASTEURIZATION PROCESS

The critical shortage of fluid milk available for Army and civilian use in many sections of the South and West is being overcome to an increasing extent by the diversion of lower grade milk from manufacturing channels. Under such circumstances it will be necessary to maintain safety and wholesomeness largely by more careful control of the pasteurization process.

The laboratory tests ordinarily employed for pasteurized milk fall short of filling this need. They are valuable in furnishing a record of what has happened between inspections, but most of them are of little practical service because the results are not available soon enough to permit the condemnation of contaminated or improperly pasteurized milk. This is true of the plate count, the coliform count, and of the various

phosphatase tests, except the Scharer field test.

We all recognize the fundamental principle of public health that an ounce of prevention is worth a pound of cure. Let us prevent those hazards to which the pasteurization process is still heir

by developing and utilizing speedy tests, the results of which are available in time to keep unsafe milk off the market. In the meanwhile the best preventive measure lies in more frequent and more careful inspection of plant equipment and procedures.

Laboratory Control of Milk under War Conditions^{*†}

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THE present emergency is forcing us to reëxamine many of our activities and to ask ourselves whether we can get the information we want with less trouble and expense than with our customary procedure.

It is generally agreed that milk for pasteurization should be reasonably free from sediment and have a reasonably low bacterial content. In addition, freedom from excessive numbers of thermoduric bacteria is being stressed in certain areas. Milk as the secretion of a healthy udder is, however, receiving far less attention than it deserves.

The ideal test is unquestionably one which will enable the instantaneous recognition of unacceptable milk. Such a test has yet to be devised. Even the odor test was shown by Schacht and Nichols¹⁶ to detect only a small fraction of the poor quality milk. Platform tests must therefore be supplemented by some other test. Particularly under the present circumstances, with growing shortages of technicians, supplies and equipment, there is much to be said for the use of one of the dye reduction tests. Such tests will vary in the amount of information furnished, but any one of them can form the basis for a quality control program.

Of these tests, the methylene blue reduction test is the most widely used. It has considerable appeal because of its simplicity. When the creaming error is minimized by periodical inversion of the tubes to re-distribute the bacteria in the cream layer^{4, 6, 17} it correlates reasonably well with the bacterial content as revealed by the direct microscopic count of *individual* cells. As the quality of a given milk supply improves, however, long hours of incubation are involved. This is one of the principal objections to the test.

Because it offers a considerable saving of time over the methylene blue test, the resazurin test has come into the picture in many countries. However, the original "one hour" test as described by Ramsdell and coworkers has certain shortcomings. Milks containing large numbers of dormant bacteria frequently fail to show a significant color change within one hour; the same is true of some herd milks containing large numbers of leucocytes.⁷ If, however, milk is incubated until a pink end point is reached, there is a much better correlation with the methylene blue results with a saving in incubation time of from 25 to 33 per cent.^{2, 7}

While overcoming one shortcoming of the "one hour" test, the "pink" test loses an advantage of the former. Abnormal milk (mastitis, late lactation, colostrum, etc.) shows a distinct color change during the first 2 or 3 hours—though not always in the first hour.⁹

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Having reached a certain stage, little further change in color takes place until bacterial activity brings about reduction to the pink, and finally to the white stage. Consequently, the pink end point test is of little value in the detection of abnormal herd milks.

In view of the increasing attention being given to abnormal milk in milk control work, a modification of the resazurin test was sought which would combine the sensitivity of the "one hour" test for abnormal milks with the greater accuracy of the "pink end point" test for bacteria. This was finally found in the "triple reading" test described by Johns and Howson,⁹ in which a color approximately half way between the original blue and the full pink (Munsell P 7/4) is taken as the end point. By observing and recording those samples which have passed this end point at 1, 2, and 3 hours, each sample can readily be placed into one of four grades.

The hourly recording of the degree of color change in the resazurin-milk mixture is particularly useful when applied to a reasonably low count milk supply. The lag following the initial marked change indicates those herds where mastitis or stripper cows may be suspected. One Ottawa dairy has made considerable headway in eliminating such abnormal milk through this method.

The triple reading test thus furnishes more complete information concerning the sanitary quality of each producer's milk with less expenditure of time and less need for trained technicians and apparatus than any test we have studied. The saving in time compared with the other dye reduction tests in the evaluation of first grade milks of equivalent quality is evident from the following:

| | | |
|-------------------------------|----|-------|
| Resazurin triple reading test | 3 | hours |
| " pink test | 4½ | " |
| Methylene blue (modified) | 6 | " |
| " " (standard) | 8 | " |

The resazurin one hour test is useful at the start of a quality control campaign, but since it fails to differentiate between microscopic counts below 2,000,000 per ml.,⁹ a more sensitive test should subsequently be introduced.

Little¹⁰ has adopted a purple pink end point, presumably very close to our Munsell P 7/4. He finds this is reached in approximately half the time required to reduce methylene blue. Fulltest information is obtained by observing tubes every ½ hour for 2½ hours, although where this cannot be done milks may be graded by a single reading after 2½ hours. In his latest report¹¹ tubes are read every 30 minutes for 3 hours, when smears are prepared and examined under the microscope to determine the type of bacteria predominating. It may be open to question whether the 30 minute readings he employs yield enough additional information over the hourly readings to warrant their use in a routine test. Burgwald¹ has also found the P 7/4 end point superior to the pink.

One drawback to the wider use of the resazurin test is that many small plants lack facilities for preparing the dye solution. In Britain standardized tablets are now on the market, and no doubt similar tablets will soon be available on this continent.

It should be emphasized that none of the tests ordinarily employed for measuring the bacteriological quality of raw milk can be relied upon to detect large numbers of thermophilic bacteria.¹¹ However, these are less frequently present where the general level of counts is kept low.^{11, 12} Our own studies³ show that of samples showing plate counts of under 5,000 per ml. after laboratory pasteurization, only 12.3 per cent had microscopic clump counts of over 500,000 before pasteurization, while of those over 5,000, 62.7 per cent had counts over 500,000 before pasteurization.

During the past year we have compared various methods suggested for the detection of significant numbers of thermoduric organisms. The resazurin test applied to pasteurized milk was found to be of no value, since thermoduric organisms generally show very weak reducing activity.⁹ In our studies the microscopic count methods described by Hileman and Leber,⁵ and Mallmann, Bryan and Fox¹³ failed to show as good a correlation with the plate count of laboratory pasteurized milk as was reported by the respective authors. The oval tube technic of Myers and Pence¹⁴ gave much better agreement and showed considerable savings in time, media, glassware, and incubator space as compared with the plate method. Little¹¹ also reports very favorably on the oval tube method, and believes it is capable of replacing the plate count altogether in routine control work.

To summarize briefly, a quality control program may be carried out with simplified laboratory procedures which make less demand upon skilled help, apparatus, and supplies. The "triple reading" resazurin test has definite ad-

vantages for the grading of milks on the basis of both bacterial and leucocyte contents, while the oval tube method is preferred following laboratory pasteurization for the detection of milks containing thermoduric organisms in significant numbers.

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Laboratory Control of Milk under War Conditions*

The Rapid Phosphatase Test

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THE rapid expansion of the use of the phosphatase test in the testing of pasteurized milk supplies almost necessitates a yearly review in order to present the advances in technic and application. Although the test was first presented as an involved laboratory procedure, its simplification has permitted its use by many who would not otherwise be able to avail themselves of its undoubted merit, and accounts for its adoption from Alaska to South Africa, and from Iceland to Australia.

The use of the so-called field test or "screen test" will continue to be justified, particularly in view of the growing shortage of technicians, but its wide adoption, and the increasing reliance placed upon its interpretation, call for a warning note. Almost inevitably, whenever a laboratory procedure is placed at the disposal of persons untrained in the laboratory, there are abuses of technic leading to unreliable results. These abuses usually involve simple precautions which a laboratorian, through his background of training, would always employ. Such conditions involve the careful preparation of reagents and the use of adequate controls. Instructions presented in the "Standard Methods" which were intended to provide safeguards on these

points have not infrequently been glossed over. It is of vital importance that these precautionary safeguards be iterated and reiterated if reliable results are to be obtained, and, conversely, when these simple measures are taken, reliable results are always obtained.

For example, taking into consideration the relative instability of the buffered substrate and the dibromoquinonechloroimide solution, it was urged that fresh solutions should always be employed, and that only sufficient solution be prepared for immediate needs. Bisected tablets were provided which permitted the rapid, inexpensive preparation of solution sufficient for just a few tests, yet there are numerous instances where old solutions are employed, leading to wholly unreliable results which may be either falsely negative or falsely positive, depending on the state of decomposition. If the procedure were adopted of always using known controls of both a pasteurized milk and one to which a small amount of raw milk is added, these false results could immediately be discounted. In the absence of a pasteurized control, it is a relatively simple matter to heat a portion of the sample to above 160° F. for a minute, and then, after permitting it to cool, to use it as a pasteurized control. The so-called positive control, simulating the presence of a small amount of raw milk, can be obtained

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by adding to this heated sample a small amount of a 0.005 per cent solution of sodium sulfocarbolate (sodium phenolsulfonate).

Unfortunately the manufacture of 2, 6 dibromoquinonechloroimide, is a difficult problem, and it is to be greatly deplored that some of our largest manufacturers have released batches of this compound which are wholly unsuited for use with the phosphatase test. Many users have complained that succeeding batches of this compound, because of its non-uniformity, have given quite different results and even required a new evaluation of standards. One lot of the compound gave a positive on every sample tested. Properly prepared, this compound is available at low cost in the form of golden yellow crystals and is extremely stable and completely reliable.

The use of the double control on the test will also detect those sources of error which are due to the presence of phenolic material in the water used to prepare the disodium phenyl phosphate solution. Where such contamination is indicated, the phenolic product can be removed from the water by extraction with ethyl ether.

The extraction of the indophenol blue, developed in the test by means of neutralized normal butyl alcohol, is a stumbling block for many, since in the desire to prevent the formation of an emulsion, the extraction is frequently incomplete. But if the test tube in which the extraction is performed be inverted quickly, 3 or 4 times, and then laid flat to permit the separation of the butyl alcohol before this act is repeated, the emulsion seldom occurs. Centrifuging, if possible, for .2 or 3 minutes, readily breaks the emulsion and permits evaluation by comparison with the suggested color standards.

The growing strategic importance of normal butyl alcohol to the war effort, and its unavailability to many, have

prompted a further modification of the rapid phosphatase test which is midway between the earlier "field test" and the laboratory procedure, and which can be utilized equally well by the laboratory or the inspector. For that reason, the name "control test" is suggested. A study of the kinetics of the enzyme activity and the inter-related pH conditions of hydrolysis and of the indophenol formation indicated that if the incubation period be extended to 1 hour, and dispensing with the precipitation technic, and adding the dibromoquinonechloroimide directly, the test becomes sufficiently sensitive for all practical purposes, i.e., sufficient color difference is developed between a properly pasteurized milk and an improperly pasteurized sample, to be readily apparent, so that the butyl alcohol technic need only be employed in borderline instances, or where greater certainty is required. This modification is suggested where time is no great factor.

In the application of any of the technics to high temperature-short time pasteurization, it is necessary to have some information regarding the pre-heating time and temperature, as well as the rated holding time and temperature before the results of the test can be properly evaluated. Similarly in the case of cream, it is frequently necessary to have some knowledge of the history, particularly the age of the sample after pasteurization, before a sample may definitely be classed as improperly pasteurized. There are certain bacteria which multiply very rapidly in cream under refrigeration, and which, within 36 to 48 hours after pasteurization, will produce a bacterial phosphatase in quantities sufficient to give a positive test. Moreover, these bacteria are seldom evidenced in the standard plate count, since their optimum growth occurs at temperatures far less than those normally employed. Characteristic of the presence of those organ-

isms, is a peculiarly offensive odor and a thickening of the cream sample. This condition is not met in freshly pasteurized creams. Aside from the exceptions just indicated, and provided acceptable reagents are employed, there

is no reason to doubt a positive finding with the phosphatase test. If inspection fails to indicate the cause, the test results are no less correct and indicate a closer coöperation between inspection and testing.

Laboratory Control of Milk under War Conditions*

Milk Testing, under Emergency Conditions

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THE Pearl Harbor treachery stimulated early action in Los Angeles County to formulate a Dairy Industry Emergency Civilian Defense General Committee. On January 8, 1942, a General Chairman, Acting Secretary, and twelve committees were set up. These included:

- Field Production Committee
- Country Transportation Committee
- Public Utilities Committee
- Emergency Processing Committee
- Blackout, Air Raid, Fire, First Aid, Watchmen and Personnel, Transportation
- Creamery Supply Men Committee
- Bottle Caps and Paper Committee
- Glass Milk Bottles Committee
- Producers Committee
- Rolling Stock Committee
- Labor Committee
- Technical Committee

TECHNICAL COMMITTEE

The Technical Committee was assigned, primarily, to laboratory and associated problems that might be expected as involved in any major bombing or attack disaster. The members of the Technical Committee appointed represent the—

- Los Angeles County Laboratory
- Los Angeles City Laboratory
- Pasadena City Laboratory
- State Department of Agriculture

Dairy Inspection
Dairy Industry

The Dairy Industry Emergency Committee is affiliated with the Los Angeles County Resources and Production Committee, headed by the County Agricultural Commissioner.

The Technical Committee held its first meeting on January 16, 1942.

A free discussion of problems that might be expected as a result of an attempted invasion, etc., was augmented by suggestions received by the chairman of the committee.

Actual problems resulting from invasion or bombing, etc., are anticipated in degrees of minor to major emergencies. Planning effectiveness will only be apparent if and when they must be placed in actual operation.

We have considered possibilities as: (1) Localized damage, minor; major; and (2) County-wide damage, minor; major.

Minor damage would not include serious failures in power or water supplies, but would involve localized or general interference with a normal routine. Major damage would involve the actual paralyzing of the usual accommodations available for standard laboratory procedures.

Within the 4,085 square miles area of Los Angeles County territory, twelve laboratory stations have materials and instruction for proceeding in the case

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of an emergency. There are sufficient supplies in each center to absorb work from an adjacent damaged area. Previous experiences in a mild earthquake produced inconvenience and provided some guidance in this planning. Personnel are instructed to report as soon as possible to their assigned positions in case of emergency, but if their own station is damaged to such a degree that it is unable to function, then these persons are to report to the next nearest station. Plans are set up for:

1. Conducting the work as nearly by routine procedure as possible.
2. Facilities for emergency procedures are available in each Center.

These include:

1. A stored, stable medium ready to melt and pour into plates.
2. Phosphatase kits (Scharer) sub-strate and indicator tablets.
3. Facilities for microscopy; *E. Coli* index, reductase test, sediment testing, etc., as needed.
4. Facilities for utilizing a substitute for a standard plate count; designed by Ray Hasson of the Griffin-Hasson Laboratories, Los Angeles, Calif.¹ This is a small French square bottle with a Bakelit screw cap; two ounce.

Agar is poured on one inner side of this bottle. The Bakelite cap is screwed on tightly; the bottle neck and cap is then dipped into molten paraffine. This keeps well as a stored, ready to use unit. This can be used even though pipettes, incubators, dilution bottles, etc., are out of commission. Planting is accomplished by pouring the liquid sample onto the surface, and immediately pouring this off, and draining the bottle for a moment before recapping.

Stand on end; cap down during incubation. Colonies developed by this technic compare as favorably to each other, in duplicate, as do standard plate counts. Milk samples can be detected as "too numerous to count," grading down to only one or two or no colonies. Rapid separation of samples into good, fair, poor, and bad is simple, even for an emergency worker, and by visual inspection. Occasional spreaders can give trouble.

A differentiating medium such as E.M.B., can be used in this bottle technic. This is a practical, usable, emergency procedure which requires no laboratory; can be "incubated" at room temperature in a dairy, in a home, almost anywhere, and serves a real emergency need; it should not be "brushed" aside as too far removed from Standard Methods.

Personnel licensed for laboratory practice by the State Department of Public Health is much in demand. In a serious emergency we can anticipate that blood bank and similar activity will necessitate using personnel for some of the work, other than bacteriological major, graduate students. This has been kept in mind in our planning. Procedures that can be carried out by high school or undergraduate student volunteers cannot involve too much skilled technic. The phosphatase, reductase, sediment, and Hasson bottle tests can be satisfactorily assigned to such workers under the supervision of a licensed laboratorian.

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Laboratory Control of Milk under War Conditions*

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WAR has brought with it both the usual scarcity of materials and man power affecting all branches of health work, and the possibility of the disruption of normal supplies and procedures by damage from bombing or sabotage.

New York State has made reasonable preparations and taken such precautions as appear to be necessary to minimize the effects of bombing and to frustrate attempts at sabotage.

A matter of immediate concern in milk laboratory work, however, is the shortage of man power and possible shortages of materials such as agar agar that enter into the standard tests usually applied to milk.

This has indicated the necessity for a critical reëvaluation of the relative public health values of the various tests being used in the examination of milk. Much has been said in the past^{1, 2, 3} about inaccuracies and inconsistencies in standard plate counts. In recent years some good work has been done to improve the standard plate count technic. However, frequent gross inconsistencies between the standard plate count and direct microscopic count on the same sample of milk indicate that in many instances the standard plate count still comes far from determining the actual bacterial content of the milk.

Furthermore, standard plate counts of samples from a raw milk supply proved to be responsible for an outbreak of septic sore throat showed counts of 10,000 or less with the infected milk in the supply. This is another indication that the standard plate count fails to answer the question that should be uppermost in the health officer's mind, namely, "Is this milk safe for human consumption?"

At the annual meeting of this Association in 1937 Tiedeman and Hohl⁴ advocated the use of the phosphatase test, coliform test, and direct microscopic count instead of the standard plate count in the examination of samples of pasteurized milk. A practical example was cited of a case in which the effort of a health officer to control a pasteurized milk supply using the standard plate count resulted in his unwittingly converting a safe supply of pasteurized milk into a decidedly unsafe one.

There appears to be general agreement among health officials that the public should have milk of good bacteriological or sanitary quality, that has been pasteurized and has not been recontaminated after pasteurization. Thus the use of the phosphatase test to determine adequate heat treatment or pasteurization, the coliform test to show possible contamination after pasteurization, and the direct microscopic count to indicate bacteria content in a general way should give the health officer just what he needs to know. Of course,

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the standard plate count may be used in this program, and the proposed use of the direct microscopic count on pasteurized milk requires further explanation.

The phosphatase test for pasteurization has rapidly come into general use. The continuous use of the test in New York State for the past seven years has convinced workers there of its value and reliability. It reveals the thing health officers should want to know most, namely, whether the milk or cream sampled has been adequately heat treated and has not been diluted excessively with raw milk. It appears that the reagents for making this test will continue to be available in wartime. While many man-hours are required to run the test, the work is justified in our opinion until a simpler method of equal reliability is developed, because of the value of the information secured.

The coliform test should be used along with the phosphatase test to detect the possible recontamination of milk or cream after pasteurization, either indirectly or by a very slight dilution with raw milk or cream that cannot be detected by the phosphatase test. This test too requires considerable man power and materials. However, the materials have not as yet become critical and the value of the test in our opinion justifies the expenditure of time.

There is one economy in the use of the coliform test that may be made without much sacrifice. Most laboratories are running three or more tubes. A study of reports on 1,813 coliform tests made in a New York State laboratory shows that the percentage of positive results obtained was increased only from 27.2 to 33.6 per cent by the use of three 1 ml. portions instead of a single 1 ml. portion.

The substitution of the direct microscopic count for the standard plate count in the examination of pasteurized

milk and cream offers the greatest possibility in this field for wartime conservation. Considerable saving is to be made in time and materials. However, although the use of the standard plate count may not be essential, the habit of making and using standard plate counts may be difficult to break.

The question immediately arises whether or not dead bacteria stain and are counted in the direct microscopic method. In using the direct microscopic count on pasteurized milk and cream for plant control during the past five years we have not attempted to settle this issue but have applied the pre-pasteurized bacterial standard to pasteurized milk and cream. The finding of a direct microscopic count above the limit has been interpreted as meaning that the prepasteurized milk did not meet the bacterial limit.

There is evidence^{5, 6} to indicate that dead bacteria, or at least some kinds of dead bacteria, do not stain. However, comparisons of standard plate counts with direct microscopic *clump* counts on identical samples of pasteurized milk show decidedly higher counts by the direct microscopic method. It does not seem to be essential to correlate the two counts, but in our opinion it should be sufficient to set new standards for the direct microscopic clump count on pasteurized milk and cream.

A study of 297 such counts made by Gilcreas will illustrate these variations. Of 240 samples with standard plate counts of 30,000 or less, the following grouping of direct microscopic clump counts were obtained: approximately 43 per cent were 30,000 or less, 22 per cent were more than 30,000 and not over 100,000, 13 per cent were more than 100,000 and not over 200,000, and the remaining 22 per cent were over 200,000.

Investigating the practical aspects of this problem as it applies to 361 comparative counts on samples of pas-

teurized milk, 66.5 per cent of the samples complied with a standard plate count limit of 30,000, and 61.7 per cent of the samples complied with an arbitrary direct microscopic count limit of 200,000. From this it appears that only a slightly lower compliance might be expected with a limit of 200,000 for the direct microscopic clump count on pasteurized milk than with a limit of 30,000 standard plate count.

In our opinion the adoption of a 200,000 direct microscopic clump count limit on pasteurized milk used in conjunction with the phosphatase test and the coliform test should enable health officials to maintain adequate public health control of such milk supplies

without the use of the standard plate count.

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Units of Local Health Service for All the States

Progress Report *

BOTH of the professional organizations concerned with the application of the science and art of medicine for the individual and his family, and through the agency of civil government for the protection and promotion of the health of communities and population groups, have within the past year declared in official pronouncements, expressed through the democratic procedure of their representative bodies,[†] their interest in the complete coverage of the area and population of continental United States by local units of health jurisdiction.

Information of a precise and authoritative kind was not available as to the extent to which the services of public health were in fact applied through full-time professionally trained or experienced medical health officers for our people under the jurisdiction of some unit of local government. Nor was there a sound basis of fact from which an estimate could be made of the number of professional and assistant personnel needed to make effective at a

modest or minimal level units of local health service reaching all areas of civil government.

To review the existing full-time local health services in each state and to prepare information in a practical form for use in promoting the extension of such services to their logical completion for all the people, the American Public Health Association, through its standing Committee on Administrative Practice, created in July, 1942, a subcommittee on Local Health Units.

It is assumed that by units of full-time local health service are meant departments of health of single or several counties or districts which are administered by a health officer devoting his entire time to such public employment, with accessory nursing, sanitary, and other personnel in proportion to the population and area involved, and supported by local tax resources or with such appropriations as the community to be served can afford from its own local tax revenue, supplemented by state and federal funds. Neither federal nor state administration of health services, as these are generally accepted, includes primary responsibility for carrying out the local health program, since the major part of direct service to the people can be most efficiently and economically rendered on a community basis.

Neither federal nor state health services can function optimally unless local government accepts primary responsibility for the conduct of those six

* Suggestions for local health units in each state were presented with supporting data in graphic and tabular form at the Annual Meeting of the American Public Health Association in St. Louis, October 26-29, 1942. This progress report was approved by the Committee on Administrative Practice at its meeting in New York, N. Y., December 16-18, 1942.

† Resolution of the House of Delegates of the American Medical Association, June 10, 1942. Published in the *Journal of the American Medical Association*, 119, 10:811 (July 4), 1942. Resolution of the Governing Council of the American Public Health Association, Oct. 29, 1942. Published in the *American Journal of Public Health*, 32, 12:1412 (Dec.), 1942.

standard health activities* which concern directly and in some respects personally the birth, life, sickness, and death of each member of the family and community, and without which the application of preventive medicine through government to any effective degree is impracticable.

In some states the only full-time public health services are those administered and paid for wholly by state government. Wherever such state administrations provide substantially a full-time health service for county or district areas, these are separately listed.

The sources of information upon which the data here presented have been based are (1) for populations and areas of states and counties, the U. S. Bureau of the Census enumeration of April, 1940,† and subsequent Census Bureau estimates of the civil population as of May, 1942 ‡; (2) for the distribution of physicians in active practice and for general hospital beds, the American Medical Association; (3) for the effective buying income by states and counties for 1941, *Sales Management*, issue of April, 1942; and (4) for the location of full-time officers and other similar administrative data, the U. S. Public Health Service and communications from the state health officers.

Analysis of the tabulated material disclosed these significant facts:

- A. In July, 1942, there were 62,032,300 persons (47.1 per cent) in 890 counties in 37 states and the District of Columbia for whom full-time health services were provided by local government in units of one

or more counties or by individual cities within these counties.

- B. There were 16,518,300 (12.5 per cent) other persons in 493 counties in 17 states for whom a full-time health service was provided by state government in single or multiple county units.
- C. In the areas where full-time health service was not provided by either county or state government, there were 77 cities‡ whose aggregate population of 12,066,100 (9.2 per cent) did receive full-time health service through city government.
- D. There were, then, 41,052,600 persons (31.2 per cent) in 1,687 counties in 41 states for whom no full-time health service was provided, and 90,616,700 persons (68.8 per cent) in 1,438 counties in 46 states, the District of Columbia, and in 77 cities, for whom full-time health service was provided by a local, city or county, city-county, multi-county, district, or state health department.

Owing to administrative changes due to movement of health officers into the armed forces, and because of considerable and continuing shifts of population within and across state boundaries, these figures must be considered as approximate only at any particular subsequent date.

The following ideas are considered by the committee to be basic and are believed to be acceptable from the points of view of the professions concerned and of the public to be served:

1. No unit of population, large or small, and no square mile of area under our civil government should be without access to or coverage by the services of a professionally trained and experienced health officer, preferably a physician with appropriate associated professional and technical personnel and equipment, and facilities for transportation to all parts of the area of jurisdiction.
2. Local responsibility for the intimate personal protective and preventive services

* Registration, tabulation and analysis of births, deaths and notifiable diseases; Control of Communicable Diseases; Environmental Sanitation; Public Health Laboratory Service; Maternity and Child Hygiene; Public Health Education.

† The total population of the states and the District of Columbia, according to the Census of April, 1940, was 131,669,275. The civil population of the same area estimated by the Census Bureau for May 1, 1942, was 131,315,393.

‡ There were 93 other cities with a combined population of 24,181,600 in 82 counties where the county as well as the city populations were served by full-time health departments. These city and county populations are included among the 62,032,300 and 16,518,300 mentioned in paragraphs A and B above.

for health is a primary essential of a democratic form of government and it should be so specified under state statute. The health functions of local government must be clearly defined, the merit or civil service system must prevail in the selection and continuance in service of the employed personnel, and sources of revenue must be authorized to meet the readily calculable costs of at least a minimal program of local health service.

3. The factors of available professional personnel and of per capita cost of good health services make it appear likely that population units of less than 50,000 may not be able to obtain and support well qualified personnel, and will find it difficult to support a full-time local health unit. For administrative efficiency and economy, a full-time local medical health officer should be employed for population units of not less than approximately 50,000 each. For large units of 250,000 or more, assistant or deputy health officers will be required, often as directors of special activities, as, for control of tuberculosis or venereal diseases, for maternity and child hygiene, malaria control, etc.
4. An area of local health jurisdiction should be of such approximate dimensions that the average distance from the headquarters to the periphery does not exceed 25 to 40 miles.
5. In planning for the creation or development of units of local health jurisdiction, the factors of effective expendable income per capita, the number of persons per physician in active practice in the area and the number of general hospital beds per 1,000 of the population should be taken into consideration. In developing district outlines an endeavor should be made so to group counties or parts of counties as to reduce large inequalities in per capita income by combining urban and rural, high and low income groups in a single jurisdiction where otherwise desirable. Also, in combining counties or parts of counties within one district an attempt should be made to group them so that the ratio of physicians will not be less than 1 to 1,500 of the population and that the general hospital beds available for the community be not less than 3 per 1,000 of the population.
6. The personnel in addition to the medical officer of health believed to be necessary for a good local health service which conducts a modest but balanced program may be expressed by the following minimum ratios:
 - a. One public health nurse for health department purposes to each 5,000 of the population. In each unit of 50,000 population, at least one of the public health nurses should be of supervisory grade.
 - b. Two full-time persons in the field of environmental sanitation for each unit of 50,000 population, one of whom should have professional qualifications in this field, preferably those of a public health or sanitary engineer.
 - c. One clerk for each 15,000 of population.
7. The offices from which local health service is administered should be housed in a permanent construction appropriate to the functions performed and the services rendered.

TABLE 1

| | | | | | | | |
|-------------|----|---------------|----|----------------|----|----------------------|----|
| Alabama | 35 | Iowa | 36 | Nebraska | 20 | Rhode Island | 3 |
| Arizona | 7 | Kansas | 27 | Nevada | 3 | South Carolina | 24 |
| Arkansas | 29 | Kentucky | 41 | New Hampshire | 5 | South Dakota | 10 |
| California | 29 | Louisiana | 26 | New Jersey | 17 | Tennessee | 31 |
| Colorado | 13 | Maine | 10 | New Mexico | 7 | Texas | 80 |
| Connecticut | 7 | Maryland | 12 | New York | 37 | Utah | 6 |
| Delaware | 3 | Massachusetts | 10 | North Carolina | 48 | Vermont | 6 |
| Florida | 18 | Michigan | 40 | North Dakota | 11 | Virginia | 19 |
| Georgia | 44 | Minnesota | 26 | Ohio | 54 | Washington | 18 |
| Idaho | 6 | Mississippi | 36 | Oklahoma | 34 | West Virginia | 15 |
| Illinois | 47 | Missouri | 37 | Oregon | 14 | Wisconsin | 20 |
| Indiana | 35 | Montana | 15 | Pennsylvania | 49 | Wyoming | 6 |
| | | | | | | District of Columbia | 1 |

If the principles above expressed so far as size of population and area of units are concerned be accepted, it will be found that approximately 1,127 units of local health jurisdiction will be needed for continental United States, of which 303 would be units of 1 county each, 677 units of 2 to 4 counties, and 147 of more than 4 counties each. It is to be understood that where a city is included within a county, only one unit of local health jurisdiction is to be recommended for both city and county populations.

The suggested numbers of units of local health services for the several states are as shown in Table 1:

Information has been prepared in tabular form giving for each state as a whole and for the suggested units of local health administration, the five items of information above referred to as determining or accessory factors, viz., Area, Population, Effective Expendable Income per Person, Ratio of Population to Practising Physicians, and Ratio of General Hospital Beds per 1,000 Population.

A summary of some of the more important and relevant facts follows.

Among the 48 states, within which there are 3,070 counties, there are 3 with less than 10 counties each (Delaware 3, Rhode Island 5, Connecticut 8), and 8 with 100 or more counties each (North Carolina 100, Illinois 102, Missouri 114, Kentucky 120, Georgia 159, Texas 254, Kansas 105, Virginia 100).

Populations and areas of the counties vary widely from 42 persons to more than 4,000,000, and from 22 square miles to 20,175 in a county. Each state has at least one county with less than 50,000 population and in 7 states the population of each county is less than 50,000, or but slightly more (Idaho, Montana, North Dakota, Nevada, South Dakota, Vermont, and Wyoming).

There are 28 states in which the

largest county has an area of less than 2,000 square miles, that is, with an average radius from a geographic center of about 25 miles.

Among the 3,070 counties and the District of Columbia, there are now approximately 907 administrative health officers in charge of units of local health service under local or state control, serving the populations and areas of 1,383 counties and the District of Columbia. In addition there are 170 full-time city health officers, 93 of whom serve cities which are located in full-time county or multiple county units, and 77 serve cities located in counties with no full-time health service.

The committee offers the suggestion that by combining some counties with others, and by including cities and the counties within which they lie as city-county units for health services, to the end that administrative adequacy and economy be attained in the direction and operation of full-time local health services, a good quality of such service can be obtained for the entire population and area of the United States under 1,127 units of local health jurisdiction under the direction of 1,127 medical officers of health.

There are at present 7 states in which all counties have some form of full-time health service (that is, under local or state direction). These are Alabama, Delaware, Maryland, New Mexico, New York, Utah, and Wisconsin. There are 9 states without full-time health services for any county unit (Connecticut, Maine, Nebraska, Nevada, New Hampshire, New Jersey, Pennsylvania, Rhode Island, and Vermont).

There are 4 states each with 1 county unit of local health administration and no local units under state district health direction (South Dakota, Indiana, Massachusetts, and Wyoming).

The committee does not propose an extension of the single county unit system of local health administration, which

would be administratively and economically unsound for very large areas and sections of the national population and would call for an increase of approximately 2,000 administrative health officers. Nor does it advocate an extension of the state district system of providing local health service, except in such areas and for such sparsely settled portions of some states as make any really effective local or county government impossible, or at least improbable, for a long time to come.

The committee suggests, for the consideration of state health officers and of state medical societies of the respective states, such reorganization and extension of full-time local health service as may be needed to reach all their people and their total area, by applying well established criteria for areas of jurisdiction, for employment of personnel, for the conduct of standard health functions, and for the support of these activities from tax resources.

According to the suggestions of the committee as graphically presented on maps of the respective states, exhibited at the Annual Meeting of the Association in St. Louis in October, 1942, of the 1,127 proposed units in existence or to be developed, 303 would be single county units, 677 units would include 2 to 4 counties, and 147 would be units of more than 4 counties each. In several instances the unit could be best created by including parts of several adjacent counties rather than the entire counties because of the geographical inconveniences in transportation within strictly county lines.

Of the suggested 1,127 units, 117 would have populations somewhat less than 50,000; 749 units would have populations of 50,000 to 100,000; 188 units would be of 100,000 to 250,000; 49 units of 250,000 to 500,000; and 24 would be of more than 500,000 population each.

Of the 1,127 units, 99 would each

have an area of less than 500 square miles; 255 would be units of 500-1,000; 412 of 1,000-2,000; 231 of 2,000-5,000; 76 of 5,000-10,000; and 54 would embrace areas of 10,000 square miles or more.

It would overload this report with figures if the data on expendable income, general hospital beds, and practising physicians by states and by the suggested units of local health jurisdictions were included, although these are available for interested persons through correspondence with the committee.

The committee plans to continue its activities in the following three main directions:

1. Extension of full-time local health service through conference and correspondence with appropriate officers of state government and with representatives of state medical societies and with other interested persons.
2. Analysis of existing statute law, and co-operation with such organizations as the National Conference of Commissioners on Uniform State Laws, to encourage the passage where necessary of enabling legislation permitting or requiring the establishment of local health services as a function of civil government throughout all the states.
3. Study of the quality and number of persons of professional grade needed in full-time employment for the conduct of at least a minimum local health program under the varied conditions of area, population, and economic status of the proposed units of jurisdiction, and preparation of estimates of per capita costs of such services based on experience in existing units. Furthermore, to estimate the number of persons, such as physicians in general and specialty practice, needed in part-time clinic, advisory, and consultative positions in local health units.

The committee hopes to be of service in making practical and effective the spirit and obvious intent of the resolutions adopted by the American Medical Association and by the American Public Health Association.

Local initiative and responsibility for

health protection are believed to be essential for national health in peace and in time of war. In this respect we are now but half prepared as a Nation.

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THE COMMISSION ON VITAL RECORDS

A REPORT of the federal government's Commission on Vital Records has just been released. This Commission stems from the Office of Defense Health and Welfare Service. It includes in its membership representatives of the War and Navy Departments, the U. S. Public Health Service, the Bureau of the Census, the Social Security Board, the Office of Civilian Defense, the Department of Justice, the Office of Price Administration, the War Manpower Commission, and state health officers. Dr. Lowell J. Reed, Dean of the Johns Hopkins School of Hygiene and Public Health, is Chairman.

In the development and utilization of vital records in the United States, we have gone through a number of phases, each reflecting a somewhat different approach to the matter. We have now passed well beyond that stage where collection and preservation of such records was a function limited to the church, and have made it a governmental responsibility, usually under health departments. Until recently, the utilization of these records has been largely in terms of their public health significance; only secondarily were they viewed as of evidentiary value in relation to place and date of birth, and parentage of the individual. However, in the past decade, birth certificates have been utilized more than ever before as evidence of these facts and it seems likely that this aspect of the vital records will become increasingly important as the results of social security legislation enter more largely into the life of the average citizen. The war, too, has emphasized the evidentiary value of birth certificates, in that proof of place and date of birth and parentage is demanded in many circumstances. However, heavy demands for certified copies of birth certificates have demonstrated that registration of births has not been nearly so complete as is desirable, that provisions for delayed registration of birth vary markedly in the different states, and that, in industries and even in different agencies of the federal government, there are varying requirements and standards which, when a certified copy of the birth certificate is unobtainable, an individual must meet in establishing age and place

of birth. It is further to be noted that an individual, having established these facts to the satisfaction of one state or governmental agency, has often been no better off as regards the final and permanent establishment of these facts of where and when he was born. Should he later, for instance, shift from employment from one state to another or from one government agency to another, he might find it necessary to obtain a completely new set of affidavits or other substantiating documents and perhaps some not previously required.

The aspects discussed above, of course, constitute only a part of the problems and deficiencies in the forty-eight quite separate state systems for the registration of vital records. These difficulties are recognized by most state health officers and, while there is no desire to replace the state and local systems by a federal one, it has for some time been generally agreed that the federal participation should be more exact, more far-reaching, more focused, and above all should serve as a coördinating element. It was a consciousness of these needs that caused the Conference of State Health Officers to request the Medical and Health Committee of the Defense Health and Welfare Service to appoint the Vital Records Commission, and the judgment of the Commission is reflected in the report under discussion. The Commission reports upon two problems which it considered: (1) The development of a scheme of national registration for purposes of identification of each individual, and (2) the need for a coördinated system of vital records for the United States. As to the first, the Commission reviewed the desirability of and the arguments against national registration in peace and in war, considered the technical difficulties involved, recognized that it would cost no inconsiderable amount and recommended that a national population registration establishing the identity of all people in the United States be carried out at this time if deemed essential to the war effort. The decision as to whether or not such an identification system is essential was beyond the authority of the Commission.

In connection with the second problem, the Commission went no further than to recommend that the existing vital records organizations of the country at national, state, and local levels be strengthened and coördinated into a system. It expressed itself as convinced that a single agency of the federal government should be solely responsible for federal participation in one or both of the undertakings having to do with vital records but it did not recommend which branch of the federal government should be so designated. A further recommendation was that the coördination of the registration systems be effected regardless of whether or not a national registration for identification is put into effect.

The Commission also expressed itself as somewhat concerned over the fact that there exists in the minds of many a confusion as to the functions of *identification*, *verification*, and *certification* as observed in connection with vital records; and believing that clarification is essential to an understanding of the differences between a system of vital records and a national registration system, the Commission in its report undertook to define these terms. It must be confessed, however, that the language in which the definitions are set forth in the report would be improved by a bit of editing. Possibly there were no lawyers present, or perhaps too many. But the report is a social document of unusual value and significance. It represents the distillate of many weary hours of work, of voluminous correspondence, of adjustments and reconciliations of opinions, and of hard thinking. We urge its study by those in public health and we take it upon ourselves to express to the Commission the appreciation of public health workers.

IS THERE AN EPIDEMIC VOMITING DISEASE OF WINTER?

SOME two decades ago alert pediatricians were struck by the fact that from time to time in the winter months they were called upon to attend large numbers of children with unseasonable gastric disturbances. With these experiences, and on a somewhat *post hoc* basis, they became suspicious of milk that had, as it were, frozen on the doorstep. Some felt that, the expansion of freezing having raised the bottle cap, contamination had occurred. Others believed that the milk had undergone a physical change which made it indigestible. Then, in 1929, Zahorsky reported from St. Louis an outbreak which he designated as Hyperemesis Hiemis, or the winter vomiting disease. He stated that he had encountered similar epidemics off and on in the past 30 years, that the outbreaks tended to occur in the winter months. He published another article in 1940 and estimated that in St. Louis, in the period February 2 to February 20 of that year, there had been some three thousand cases of this winter vomiting disease. He did not subscribe to the frozen milk theory but came to the conclusion that the conditions existing in late fall, winter, and occasionally early spring, contributed to an unusual abundance of proteolytic organisms in milk, even though pasteurized; that it was the ingestion of milk heavily loaded with these putrefactive bacteria that caused the vomiting syndrome. In this report there is no evidence that Zahorsky made a detailed epidemiological study of cases as regards the ingestion of the milk in question nor are there any data to substantiate a belief that the disease was in effect limited to those who drank such milk.

A more recent contribution to the literature of the vomiting disease comes from Waring who, in the September, 1942, issue of *The American Journal of Diseases of Children*, reports the vomiting disease as it occurred in Charleston, S. C., in the winters of 1941 and 1942. He estimates that the number of cases was in the thousands, with symptomatology essentially the same as reported by Zahorsky. In addition, many other outbreaks have occurred, some of which have been studied, but the majority were uninvestigated and unreported. Waring's observations would tend to offset Zahorsky's hypothesis that the causative factor is milk with a high content of putrefactive organisms, in that there appears to be no food or drink common to the Charleston cases.

The condition seems to be limited essentially to young children, although occasionally adults are affected. When there are multiple cases in a family, the outbreak is not explosive, as in food poisoning, but the individual cases tend to occur in sequence: One child has an abrupt onset, is ill for two or three days, then a second child is affected and possibly a third individual some days later. This causes one to speculate as to a period of incubation. High fever is not a characteristic, though usually there is a slight elevation of temperature. Zahorsky reported more than half of the cases to have a coincident upper respiratory infection. Waring found respiratory involvement unusual. The stools are loose, light in color, without pus or blood, with an offensive odor suggestive of putrefaction. The most characteristic symptom, however, is vomiting. In many instances this is violent, frequent, and excited by anything taken into the stomach. The disturbance lasts for from two to four days and, though the child sometimes appears quite ill and may give evidence of dehydration and rather serious exhaustion, fatalities are practically unknown.

In the outbreaks reported, it has seemed not practicable to obtain productive bacteriological and virus studies, nor have the conditions been such as to permit the

collection of detailed epidemiological data. More information is therefore needed before it may be concluded that one and only one cause is operative, that one and only one condition is being dealt with, that this one cause will produce only this one condition, and that this condition may be produced only by this one cause, etc. It may all be a mare's nest, sheer coincidence, a syndrome brought about by diverse causes, the by-product of a sore throat or, possibly that rock of refuge, "intestinal flu."

Epidemiologists who feel that there is little left for investigation might do well to keep alert as to the occurrence of the winter vomiting disease in their communities. Here is a chance to assist in obtaining an answer as to whether or not this is a clinical entity. If it is, is it infectious and how; and what is the nature of the infectious agent?

LETTER TO THE EDITOR

TO THE EDITOR:

For some time now, I have cherished the opinion that the JOURNAL does not make statistical mistakes or indulge in bad statistical practice. I should like to comment, therefore, on a minuscule item on page 94 of the current January number, Vol. 33, Number 1. Under the heading "Epidemiologic Note" you quote an average incubation period of "12.2 plus or minus 1.1 days."

It is our practice to teach that the use of the \pm following an average is distinctly undesirable, especially where it is not clear from the context what the number following the \pm stands for. That number is usually the probable error of the average in question, although there are instances where it turned out to be the standard error. In either instance, I venture to say, the meaning of the \pm term is not clear to the average reader, and for that reason it had best be avoided.

Referring to the article you cite in the J.A.M.A., and without attempting to reconstruct the calculations based on the data presented, it may be assumed that the average of 12.2 days has a probable error of 1.1 days. Strictly this should be interpreted to mean that if the true average incubation period for all cases were 12.2 days, and if sets of

observations similar to those presented could be made repeatedly, the averages could be expected to vary due to chance alone so that only 50 per cent of them would lie between 12.2—1.1, or 11.1 days, and 12.2+1.1, or 13.3 days. The remaining 50 per cent of the averages would be expected to lie outside of this range, i.e., below 11.1 days or above 13.3 days. Moreover, it is not known that the true average is 12.2 days, and by reasoning from the above it could easily be as low as 8.9 days or as high as 15.5 days (three probable errors below or above the observed average), assuming a normal distribution of incubation periods. In other words, if the true average were 8.9 days, the average of 12.2 days observed here could easily have occurred due to chance variation alone. Similarly if the true average were 15.5 days.

In a group of 37 cases therefore, one should not be surprised to find an average anywhere from three probable errors below the lowest likely true average to three probable errors above the highest likely true average, namely, between 5.6 days and 18.8 days. Unfortunately, very few readers would instinctively place this interpretation on the expression "an average of 12.2 \pm 1.1 days." I believe it is safe to say that most per-

sons would simply conclude that the average may vary from 11.1 to 13.3, and no more, which would be incorrect.

In order to avoid misleading the uninitiated, I believe one should merely state that an average of 12.2 days was observed, and that this average had a standard error of 1.6 days (the figure from which a probable error of 1.1 days must have been derived). A careful reader would then make it his business to understand the meaning of "standard error." The use of the notation " \pm " followed by the value of one probable error does not convey the thoughts of

modern statistical reasoning. It should be considered as out-of-date as the idea of keeping our screened windows shut tight at night in order to avoid malaria. I should like to suggest that the JOURNAL promote the education of the average reader in this respect as it does in so many other respects.

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Report of the Chairman of the Executive Board to the Governing Council*

TWELVE days after Pearl Harbor, the American Public Health Association, through its Executive Board, made a declaration for the fourth time since its foundation in 1872 of its professional aims in the interest of national health. The declaration had behind it the urgency of the days immediately following December 7, when every American took counsel with himself and asked "What can I do?"

It seemed imperative to remind public health workers that they might show the highest standard of practical patriotism by staying on their jobs. It seemed imperative, too, to state in terms of the present, because of their vastly heightened need, certain long-term objectives with respect to official health organization in the United States. This was intended to suggest a wartime platform for the public health profession.

The Declaration read in part:

"While health officers and health departments, state and local, city and rural, are expected always to be on duty to fulfil urgent and enduring needs of every population unit and area under the jurisdiction of civil government, the state of war calls for a clarification of aims, some simplification of organization, and a considerable strengthening of effort to develop and keep fit a nation of superior men, women, and children, capable of an optimum life within the privileges and duties of free peoples. . . .

"Our one first aim is victory for the United Nations, and to this end, we, as a body of public servants, pledge all the resources of our professional and technical capacities.

"Any neglect or curtailment of the essential protection of civilian health, whether at home or in the factory or other work place, is inconsistent with maximum efficiency of the military forces.

"The trained civil health worker is properly considered indispensable to the maintenance of national health, and he should be encouraged to continue at his regular station in civil government unless it becomes perfectly clear that the war can be more effectively prosecuted by his transfer to military service.

"Those states and more limited areas now wholly or in large measure lacking the reality and, in some instances, even the form of responsible health service by trained and experienced health officers, devoting their entire time to the public need, and to enforcing the reasonable and necessary provisions of sanitary and public health law, should with all speed be provided with health officers competent to give leadership and direction, and authorized to spend public funds sufficient to make health services a reality for every unit of population and for every area of civil jurisdiction.

"The effective modern health department, as now conceived and at present organized in many states, cities, and counties as a branch of civil government, comprises a medical, sanitary, and related biological and social competence which enjoys broad authority to meet a wide variety of medical and environmental emergencies.

"Where such an organization exists and has under control the preventable factors related to disease and death, the health officer and his staff must be alert to extend, and, if necessary, to modify the usually accepted health functions to meet the multitude of exceptional situations certain to be created by the state of war and by the mobilization of all the people and their industry to support the armed forces.

"In spite of the fact that the creation of authority and organization of health resources of the respective states and insular and territorial jurisdictions on a centralized basis under the federal government appears at present to be neither desirable politically nor

* Presented at the Seventy-first Annual Meeting of the American Public Health Association in St. Louis, Mo., October 26, 1942.

practical legally, nevertheless, the American Public Health Association recommends and urges upon the health officers of every jurisdiction of civil government in the United States, that they think of themselves as conducting an essential portion of a national project for the people's health and acting at all times as if they were in fact and within the law at the administrative disposition of the Surgeon General of the United States Public Health Service.

"If we will accept and act with vision and confidence upon the principles and policies here declared, it will appear that what is needed for victory in arms will be provided for both military and civil portions of our population without sacrifice of the continuing and progressive health needs of a people devoted to the humanities of peace."*

Twelve days after Pearl Harbor, the Executive Board devoted many hours to a discussion of the obligations and responsibilities of the American Public Health Association, as the recognized organization of the public health profession in the national crisis. The conclusion was finally reached that the Association would more appropriately carry on its routines, responding to calls upon it as occasions might demand, than to set up a predetermined plan of immediate and future action.

It was the conviction of the Board that, as mobility and maneuverability are very valuable characteristics of our war machines, so are they in a professional society working in a sphere where there are as many variables as exist in public health. The Board saw its duty as that of keeping our professional society in a position to swing into action on demand, and to be ready, at a moment's notice, to direct our professional strength against any salient that might be assigned to us.

This decision, too, is found to have been wise.

The pattern of the Association's work during this wartime year has been adjusted to these decisions of the Execu-

tive Board. We have moved to closer and closer identification with the war. Documentation will be found on every page of the program of this 71st Annual Meeting and throughout the agenda for the meetings of the Governing Council.

As Americans and as public health workers we have witnessed and have been affected by the national readjustment from pursuits of peacetime to armed conflict. No aspect of the transformation has been without special significance for the public health worker. Think for a moment of a few of the new words and phrases which are in general use, and consider the public health worker's concept of them and that of the general public. "Defense area" and "critical area" awaken his professional instincts, conveying to him more than the fact that business is booming. "Rationing" of food, of fuel, and of some critical materials means shortages and inconveniences to the public but, to the health worker, they mean possible health hazards. Rehearsals of procedures to be followed in case of "air-raids" are coming to be common practice. No one better than the health officer realizes how much more than the rescue and treatment of "casualties" would be involved in the bombing of a community. The phenomenal "defense plant" wages made possible by long work hours are not cause for jubilation to the health worker, nor are the lowering of standards for working conditions and for occupational age levels. His problems increase with the building of the new airplane factory on the edge of town, although it brings a seeming prosperity to the townspeople. Plans for "evacuation" of populations, or of mothers and children, are being worked out in many places, with frequently unacknowledged, but ultimately great dependence upon the health personnel of the areas. And, while the nation has been absorbing the full fact of war, while the new situations with all their

* A.P.H.A. Yearbook, 1941-1942 (Supp. to A.J.P.H., Mar., 1942, p. 40.

important implications for health workers have been expanding our vocabularies, our trained public health workers, never ideally numerous in ordinary times, have been and are being increasingly drawn for service in the armed forces. These facts have not been outside the focus of Association interest.

It is inevitable that the awareness of public health workers to these problems and their attempts to cope with them should be the very fabric of the 1942 meeting of the Association. What will be said will encourage, or some of it may depress us, but certain it is that we start forces in motion here, for better or worse, which will not be spent for months and years to come.

Recognition of the authority of the Association has come from many sources this year. The Army and the Navy have purchased hundreds of copies of *Standard Methods for the Examination of Water and Sewage*, and *Standard Methods for the Examination of Dairy Products*. The volume on *Diagnostic Procedures and Reagents*, among other Association publications, has been micro-filmed and flown to China for use in war areas. A condensed version, in Spanish, of *Standard Methods for the Examination of Dairy Products* is under discussion as a result of frequently expressed need by health workers in Latin American countries. The American Red Cross has designated the *Report of the Committee on the Control of Communicable Diseases* as an essential item in the equipment of its instructors in first aid. Another interesting fact about this report is that its placement in the hands of all the state health officers early this spring resulted in not a few revisions of communicable disease regulations and a wide distribution of the report which has been reprinted by the United States Government. The Tolan Committee on Defense Migration of the Congress called representatives of the Association to testify before it. The U.

S. Public Health Service published, as *Reprint 2359* from *Public Health Reports*, an appraisal technic for urban problem areas as a basis for housing policy of local governments, a report of a subcommittee of our Committee on the Hygiene of Housing. One need only scan the numerous published summaries of happenings in public health and related professions, and examine bibliographies supporting articles appearing in books and periodicals which serve many varied fields, to see how heavily the authors have leaned on the JOURNAL and other Association publications. These examples are a very few of many that might be cited.

We have said that progress can be reported toward putting into effect certain recommendations in our latest official declaration of policy. One of these was "clarification of aims." The JOURNAL may be credited with accomplishing some of that. Responsible for the wise selection of articles and the interpretive editorials are Dr. Harry S. Mustard, the Editor, an office he has distinguished for nearly two years, and a group of associate editors which was enlarged during the year to bring even more special skills into publication counsels. "Some simplification of organization" was another recommendation. A recently appointed and very active Subcommittee on Local Health Units of the Committee on Administrative Practice, under the Chairmanship of Dr. Haven Emerson, is now at work with this end in view. It is studying the present status of locally governed health units in the United States and will propose a redistribution of area and population, under full-time health units, which will be consistent with good administrative practice. The first report of the committee* will be made at this meeting in the form of an exhibit of state

* See report, page 404, this issue.

maps, showing present areas of local health administration and proposals for health units under full-time medical health officers. Although these suggested groupings of area and population are of a tentative and provisional nature, they serve better than any previous attempt as a basis for discussion of the number of doctors, engineers, nurses, and other specialists which will be required in any adequate health program for the nation and, as well, the number of persons of such training which should be withheld, for national safety, from military service. It is gratifying to note the common interest in this field of investigation between the American Public Health Association and the American Medical Association. The House of Delegates of the latter organization has recently passed a resolution signifying its belief in the need for, and its intention toward implementing, such a study as our committee has now undertaken.

A third recommendation was "a strengthening of effort." This is a matter for the individual health worker, for committees and sections in his professional society, and for the society itself, where individuals, committees and sections are extended, and where interplay and teamwork of the whole are made possible. We shall have evidence at this meeting of how much strengthening of effort has been achieved.

As for our routines, and they are described thus only to differentiate them from activities begun or strikingly altered during the year upon which we are reporting, they go on—showing constant growth and development as they have for several years past. I refer to the promotion and maintenance of membership, the Employment Service, the Information Service, the Book Service, and other projects which render service to the membership or which add to our revenues in order that the membership may be better served. We have announced in successive reports member-

ship figures that exceed those of the year before. We have pleasure in doing it again. The number of members and Fellows on the rolls on the first of September, 1941, was 7,108; on the first of September, 1942, it was 7,489, again an all time high.

The attention of the Governing Council was drawn last year to the extraordinarily high qualifications among many of the applicants for Fellowship whose names were presented for Council action. We said that this augured well for Association leadership. It is possible to speak with equal pride of the 139 Fellowship applicants whose names will come before you this year. It is a testimony to the growing prestige of the Association that 468 persons have asked and received this recognition at the last five annual sessions. The higher standards imposed by the Governing Council during this period have resulted in more than doubling the number of applicants.

Several new Association publications have appeared during 1942, among them the first section of an extensive report on lead poisoning, by a committee of the Industrial Hygiene Section, and a report on bathing places by the Joint Committee of the Conference of State Sanitary Engineers and our Engineering Section. *Community Organization for Health Education*, a report of a study of a committee of the same name, made possible by a grant from the Charles H. Hood Educational Trust, was widely accepted, and the entire edition of 10,000 copies was distributed. The Committee on Professional Education has issued additional reports on educational qualifications of several categories of public health workers.

The Association during the year has been actively identified in the developing program of the National Health Council and its Committee for the Study of Voluntary Health Agencies. An appropriation for this purpose over a three year period has been made by the

Rockefeller Foundation, and Selskar M. Gunn, Vice-President of the Rockefeller Foundation, has been given leave to direct this study. Association channels have been useful in the early months of this work to promote an understanding among health workers as to the purposes of the study and to open doors locally for Mr. Gunn and his associate Philip Platt, Ph.D., recently of Honolulu. The work of this committee will be the subject of a general session at this meeting. It is to be hoped that out of the study there may come a new orientation of voluntary agencies in the American scene.

In connection with the current widespread desire to promote hemispheric relations among the republics in this part of the world, it is interesting to recall that 1942 marks the 40th anniversary of the formal identification of the Republic of Cuba with the American Public Health Association, and, as well, the 50th anniversary of the extension to Mexico of the Association's sphere of influence. This is no new program for the American Public Health Association. It will be recalled that, at the 70th Annual Meeting in Atlantic City, no less than 44 representatives were present from Latin American countries, thanks to the coöperation of the Pan American Sanitary Bureau and the Coördinator of Inter American Affairs. It was a fine opportunity to build strong bridges of understanding in the applied science of public health. It is hoped that the invitations extended to these countries again to be represented at this meeting may be accepted. The Chairman of the Executive Board had the opportunity in person to present recently at the meeting of the Pan American Sanitary Conference in Rio an invitation to his colleagues, with special reference to the public health engineers, among whom there is increasing evidence of the shift of their interest to North America.

It is worthy of note that the official agencies responsible for the organized effort of promoting understanding between the republics of the Western Hemisphere have adopted projects in public health as an opportunity to express the growing interest and the co-operative support for this part of our common destiny. Well qualified leaders among those identified with the American Public Health Association are responsible for the health aspects of this program. If any further evidence were needed of the acceptability of public health as a means of promoting national and international welfare, this adoption by official agencies of the technics long used by this professional society and by the foundations is outstanding.

There is currently under discussion the desirability of preparing an abbreviated document summarizing the steps in the laboratory examination of milk as outlined in the 8th edition of *Standard Methods for the Examination of Dairy Products* and for the translation of this digest into Spanish, in order that the technical staffs as well as the directors of these laboratories in Spanish-speaking countries may have access to this American Public Health Association standard with its increasing international significance.

It is not the purpose of this report on behalf of the Executive Board to encroach upon the special fields of interest of the standing committees, on which there will be formal reports by the respective chairman. Mention must be made, however, because of its significance from the standpoint of Association policy, of the present status of the Merit System project. Begun more than a year ago on a modest basis, this effort to prepare examination questions for workers in the various public health specialties has expanded until it is now possible to estimate something of the scope and importance of the venture.

Originally started at the request of

the U. S. Children's Bureau and the U. S. Public Health Service, this venture grew out of a recognition of the lack of competent materials for the examination of professional workers in public health. In an effort to apply what is good practice in personnel administration and examination technic, a study was begun and questions were developed in the field of public health nursing.

Through the generosity of the Children's Bureau, which loaned a staff member, and with the coöperation of several state health officers, funds were made available for this study and a staff was employed which has now developed questions for public health nursing of the objective type to the number of more than 2,000. These have been made available to several state merit system councils on request and are accessible to all such agencies on a non-profit basis.

The success of the nursing questions has been such that the project has now moved into the field of preparing material for the examination of administrative health officers, and we hope soon to explore the field of environmental sanitation and the field of the laboratory. It is necessary for this purpose to maintain a staff of test technicians and subject matter specialists, and continually to secure the counsel of young and imaginative workers of the better sort.

Assured of splendid coöperation from the members of the public health profession, this project can be expected to move into new ground and to continue to realize the expectations which the Committee on Professional Education, the Executive Board, and the Governing Council have hitherto expressed, believing that this is one of the most productive and fruitful enterprises with long-range relationships to the quality of public health work which the Association in its long history has ever sponsored. Opportunities will be afforded at this Annual Meeting to extend the

understanding by public health workers of this venture.

FINANCIAL STATUS

The financial status of the Association again gives cause for satisfaction. The year ending December 31, 1941, was closed with a small surplus, and for the first nine months of the current year both estimates of expense and income have kept approximately within the budget adopted by the Executive Board in December, 1941, which anticipated total expenditures for the year of \$162,212.35, and total income of \$162,386.67. Increases in the expense of JOURNAL publication due to printing and paper costs represent the only substantial deviation from these estimates. An increased circulation has put an even greater strain on these items in the budget but it is expected that the overall balance will be not unfavorable. It is reasonable to expect, we think, that these estimates will stand until the Executive Board is able to review the experience of eleven months when it meets in December, and in particular, to know the result of this Annual Meeting which is the largest variable item in the budget and about which we must make our estimates conservatively.

ACKNOWLEDGMENTS

Once more it is my pleasure to congratulate all who have given service in this coöperative enterprise which is the American Public Health Association—the members of the Governing Council, of the Executive Board, the officers and sectional committees, the standing committees, or those who have helped in some other capacity to make this 70th year important in Association annals. We bring sincere thanks to those individuals and agencies who have provided funds for Association purposes without which a good deal of our work could not have been done this year—or

any year. The following list of sustaining members of the Association represents, in the aggregate, an item which is 11 per cent of our membership income, and which has helped beyond any other single category of the membership to sustain the Association through lean years and to provide a backlog at all times that has made possible many of the objective achievements of this professional society:

The Chlorine Institute, 30 E. 42nd Street,
New York, N. Y.
Mrs. Moses H. Cone, 1800 Eutaw Place,
Baltimore, Md.
Equitable Life Assurance Society, 393 Seventh Avenue, New York, N. Y.
The Gilliland Laboratories, Marietta, Pa.
International Association of Ice Cream Manufacturers, 1105 Barr Building, Washington, D. C.
John Hancock Mutual Life Insurance Company, Boston, Mass.
Life Insurance Company of Virginia, Richmond, Va.
Metropolitan Life Insurance Company, New York, N. Y.
National Life Insurance Company, Montpelier, Vt.
The Prudential Insurance Company of America, Newark, N. J.
Sun Life Insurance Company of America, Baltimore, Md.
The Travelers Insurance Company, Hartford, Conn.
Union Central Life Insurance Company, Cincinnati, Ohio
Western and Southern Life Insurance Company, Cincinnati, Ohio

To our advertisers and our commercial exhibitors, many of whom are long-time and faithful friends, we express our appreciation for continued interest and support.

In addition, I wish to thank the W. K. Kellogg Foundation, the Commonwealth Fund, the Metropolitan Insurance Company, the Milbank Memorial Fund, and the John B. Pierce Foundation for contributions which have made possible the rural and city health conservation contests, the work of the Committee on State Studies, the work of the Committee on the Hygiene of Housing, and other activities to which reference is elsewhere made.

The large amount of work accomplished by the Association during this past year reflects the earnestness, enthusiasm, and hard work of Dr. Reginald M. Atwater, the Executive Secretary, and his staff of loyal workers. The Association is deeply grateful to this group which has served so quietly, smoothly, and effectively.

So, in brief summary, stands the 70th year of the American Public Health Association. To the record there should be added the twelve issues of the *American Journal of Public Health*, the 1941-1942 *Year Book*, the 20th edition of the *Bibliography on Public Health and Allied Subjects*, *News Letters*, *Proceedings of the Eighth Institute on Health Education*, and other periodical publications of the Association. Even then one must admit that the most vital contributions of this society lie in an intangible realm, where the growth of our leadership and prestige is to be found. It is a good record to mark this anniversary year of the Association.

ABEL WOLMAN, DR.ENG., *Chairman*

Administrative Practice*

THE Committee on Administrative Practice acknowledges with gratification the leadership of Dr. Eugene L. Bishop who served as its Chairman from 1937 through 1941. The record of the committee's activities during this period is a splendid tribute to his far-sighted guidance.

During the past twelve months, the program of the Committee on Administrative Practice, which begins its 23rd year at the 71st Annual Meeting of the American Public Health Association, has been divided into three categories:

1. Conduct of Special Studies and Services
2. The Analysis and Evaluation of Administrative Practices
3. State Studies and Consultation Service

SPECIAL STUDIES AND SERVICES

The interest of industrial and trade organizations in industrial hygiene and the activities that are being sponsored in this field have been fostered, in no small measure, through the interest and activities of the Subcommittee on Industrial Health Studies during the past several years. This group has attempted to publicize the value of applying the health appraisal plan to industry.

At the December meeting of the Committee on Administrative Practice in New York, this subcommittee felt that its original purposes had been fulfilled, and suggested the possible desirability of its discharge. The Committee on Administrative Practice, however, believed that it was essential for the Association to promote activities in the field of industrial hygiene during the

national emergency period and in the post-emergency period. It was therefore decided that this subcommittee would be continued and that its personnel be augmented or reorganized and its program broadened as the situation warrants.

The Subcommittee on Public Health Nursing which functions as the Committee on Nursing Administration of the National Organization for Public Health Nursing has proceeded with a study of nursing services in clinics. The field work for this study has been supplied by consultants of the U. S. Public Health Service and the Children's Bureau. Information based on a special schedule has been collected and is in the process of tabulation for approximately 200 types of clinics in various parts of the country.

It is anticipated that a report on this study will be released by the end of the year. This subcommittee proposes to make public this information as soon as possible since it is believed that it will be of assistance to agencies faced with making administrative changes due to the war effort.

The Study Committee, of the Subcommittee on State Health Studies, which has been concerned with the Development of Principles and Criteria for the Allocation of Public Health Funds from the State to the Municipal and Rural Health Units has held its activities in abeyance in the past several months on the recommendation of the chairman.

The Subcommittee on Manual of Practice and Appraisal of Local Health Work is collecting information for the revision of the *Appraisal Form for Local Health Work*, but it will in all

* Report of the Chairman of the Committee to the Governing Council, October 26, 1942.

probability not publish the final revision until the war is over.

The Study Committee on Sanitation has now completed a *Special Sanitation Appraisal Form for Local Health Work*, and the preliminary trial of this form has been approved when and if funds can be secured which will make this possible.

A new Subcommittee on Local Health Units was recently appointed to attempt to determine how many health officers were actually needed for local health jurisdiction on a full-time basis in order to render adequate service for all areas of the country. It was felt that until such an analysis was made there would be no way in which to determine how many physicians and other personnel with special health training should be held out of military service, if possible, in order to insure reasonable health services for the country as a whole.

ANALYSIS AND EVALUATION OF ADMINISTRATIVE PRACTICES

The Measles Studies have been continued and a report on these was presented at a meeting of this Subcommittee on Evaluations held during the Annual Meeting. Tests of specific pertussis antigen for skin reactions have been made during the past year and were also reported on at the meeting of the subcommittee just referred to.

The Goiter Study Committee has carried on active conferences and study work and has been attempting to prepare a report on which a statesmanlike and effective national program for goiter prevention can be based. The report of this committee was also discussed at the meeting.

A report of the five year studies on diphtheria was published in the July, 1942, issue of the *American Journal of Public Health*.

Another evaluation study which is being conducted on a limited scale is that promoted by the Subcommittee on

Organized Care of the Sick. This group has been largely concerned with the problem of public medical services as exemplified by the provision of medical care to recipients of public assistance and to the medically needy. A brief questionnaire on the administration of general medical services by health departments has also been prepared, and information is being secured by the Field Staff of the American Public Health Association during their regular field trips. It is hoped that in due time sufficient information will be available to permit a careful analysis.

The annual City and Rural Health Contests, recently renamed the "National Health Honor Roll," were announced in June. The *Fact-finding Schedule* has been further revised and is now known as the "Evaluation Schedule." Last year's revision demonstrated the value of the new schedule as a stimulating tool for the progressive health officer. Now refinements have been made as a result of one year's experience.

The need of good citizen health in wartime has stimulated activity in the National Health Honor Roll and the enrollment records to date are as follows: There are 150 individual cities and 350 counties enrolled, each of the latter has at least one city in its area. Therefore, including only the county seat in the participating counties the total number of entries is 500 cities and 350 counties.

A four page miniature newspaper devoted entirely to the Health Contests—now the National Health Honor Roll—is issued monthly, and the health officers have been very coöperative in preparing material for it. The value of this little paper as a means of exchanging ideas and telling of results of participation has been amazing. In order further to stimulate interest, those cities and counties which attained the National Health Honor Roll last year

will be carried on the Honor Roll for at least two years without the necessity of filling out the complete *Evaluation Schedule*, provided they satisfy the Grading Committee that their programs have not retrogressed.

STATE STUDIES AND CONSULTATION SERVICE

During the past year, under the sponsorship of the Subcommittee on State Health Administration, the States of Illinois and Washington were studied. A request for a survey of West Virginia was also accepted by the Subcommittee, and preliminary work was started in the state but because of a serious depletion of professional personnel in the State Health Department, it was finally decided not to continue the study at this time. This decision was accepted by the State Department of Health, and the West Virginia Public Health Association as well as by the Subcommittee on State Health Administration.

In addition to the two new states studies, continued advisory service was given to Oklahoma, Florida, and Manitoba. Considerable service was also given in Michigan, but since this was financed by the W. K. Kellogg Foundation it cannot be considered consultation service in behalf of state studies, but it is hoped that the work may have a beneficial effect upon public health practice in that state.

A highlight of the state studies project during this year was the governmental meeting called by the Premier of Manitoba shortly after the report of that study had reached the members of Parliament. The field director of the American Public Health Association was invited, and a discussion of the recommendations of the study lasted over four hours. This meeting resulted in effective action.

The provincial legislature increased its public health appropriations by over \$60,000 (a substantial amount in Manitoba) to carry out the more important major recommendations.

A study of "Public Health in the Oranges and Maplewood, New Jersey" was made with the coöperation of the National Organization for Public Health Nursing, at the request of Community Chests and Councils, Inc.

Under the auspices of the Committee on Administrative Practice, at the request of Community Chests and Councils, Inc., and the Columbus Community Chest, Professor Ira V. Hiscock completed a public health study in Columbus and Franklin County, Ohio, which has already produced gratifying results.

In summarizing the activities of the Committee on Administrative Practice during the past year, it is apparent that every effort has been made to promote and carry on its program in such a way as to make available all the resources of its facilities to the war effort. The Information Service which it conducts for the Association has been able to assist various branches of the army and navy in securing certain types of information. The entire program of the committee, although it has not been set up on a wartime basis, has been sufficiently flexible to embrace whatever activities, within its scope, might be of general use at this critical time.

The greetings of the committee are extended to its many friends. Its appreciation for the assistance of those who have helped in its promotion in the past year is best expressed in its resolve to expand its program further in whatever way will be of most assistance in the promotion of public health.

HENRY F. VAUGHAN, DR.P.H.,
Chairman

Professional Education*

ON October 25, 1932, ten years ago yesterday, the Governing Council approved an amendment to the By-Laws which resulted in the birth of a new standing committee to be known as the Committee on Professional Education. Today, as we celebrate the tenth anniversary of this committee we rededicate ourselves to the task of "carrying out research and the development of standards for professional education and training in public health . . . with a view to maintaining professional qualifications of high standard"—a charge bestowed on us at our birth.

While we are aware of our infancy in the family of the Association's standing committees, we believe there is justification for our pride in the accomplishments which the years have produced. I refer to the formal reports which have received the blessing and approval of this Council. Much effort has gone into the making of these reports, and at times it has seemed as though the obstacles were insurmountable. It is a tribute to the men and women who have served their Association so well as members of this committee and its subcommittees that the general acceptance of these reports has become an established fact. Many of you will recall the controversy that raged around the Report on the Educational Qualifications of Health Officers. Today it stands as an accepted document by the profession. Similarly, the reports dealing with educational qualifications of public health engineers, sanitarians, subprofessional field personnel in sanitation, statisticians, nutritionists in health agencies, school health educators, and industrial

hygienists, emerged from controversy as sound contributions to "professional qualifications of high standard."

Lest it be thought that in our satisfaction at these accomplishments we are content to accept your approval of a report as carrying with it a stamp of finality, I mention again our established policy of reviewing these statements from time to time and revising them as the need arises. As evidence of this intent we shall ask you today to withdraw a report which you approved in 1938, because we are convinced that it has already served its usefulness and the changes brought by time have made it desirable that a new report be drawn up. We shall also ask your approval of a revised report on "Recommended Qualifications for Public Health Nursing Personnel."

Even though the members of this committee are so widely scattered geographically that it is not possible to hold more than one interim meeting between Annual Meetings, it is always a source of satisfaction to note the large attendance at these sessions and the inherent interest in the committee's affairs by its membership. It is particularly gratifying to note the deep interest of several members of the Executive Board whose attendance at these meetings has become more and more frequent.

When last we met in April, a careful review and evaluation of our procedures was made. Your committee faced realistically the fact that there will be a tendency to lower educational qualifications because of the current shortage of professional personnel. With confidence in the future, however, the committee expressed its belief that it should continue to aim at high standards rather than risk the effects of incompetence if

* Report of the Chairman of the Committee to the Governing Council, October 26, 1942.

standards were lowered. We recognize the fact that temporary expedients may have to be resorted to by some health departments during the early war period.

On the theory that all those who choose public health as a career should have basic training in public health, the committee agreed on the principle that, for the time being, professional education should be considered to mean public health training at the graduate level, or subsequent to basic or legally recognized professional training.

A uniform outline for the preparation of all future reports has been adopted, as well as a routine of procedure for dealing with subcommittee reports. These, we believe, will provide the Council with mature reports reflecting the maximum agreement obtainable among all interested parties.

A most significant statement was issued by this group as a memorandum entitled "Minimum Educational Facilities Necessary for the Postgraduate Education of Those Seeking Careers in Public Health." This statement was published in the JOURNAL* and was sent to the dean of every medical college, to all schools of public health, to university presidents, as well as to other influential groups. We believe this document has important bearing on the situation which we face today in the education of those who will be the professional leaders of tomorrow.

We feel that this statement is sound for the time being, and that it is of considerable current importance to those contemplating the establishment of schools of public health, as well as those seeking good public health training.

Pursuing its policy of coöperation with other groups, the committee has worked closely with the Committee on Teaching of Public Health and Preventive Medicine of the Association of

American Medical Colleges. This latter group in April brought to your committee a report which covered findings and conclusions as to the present status of teaching preventive medicine and public health to medical students. It is hoped eventually that the committees involved in these Associations may reach certain definite principles and approach a report that can be submitted to and approved by both associations. At the session of the Committee on Professional Education, Dr. Wilson G. Smillie, *Chairman* of our Subcommittee on Teaching Preventive Medicine to Undergraduate Medical Students, will report on the actions taken by the Association of American Medical Colleges in regard to this problem, which will be discussed in Louisville, where Dr. Smillie is in attendance.

Another organization with which your committee has established a fruitful relationship is the Association of Schools of Public Health. Our Subcommittee on Field Training Centers has already made plans for joint consideration of its problems. The committee has thus cultivated studies and discussions beyond its immediate purview.

There are now pending before your committee reports dealing with the educational qualifications of health educators, laboratory personnel, maternal and child health specialists, specialists in mental hygiene and in cancer control, and public health dentists. These reports have been prepared in accordance with our newly adopted policy, and it is anticipated that by this time next year we shall be prepared to ask for your approval of them.

During the year two new subcommittees were set up, one to deal with qualifications of school physicians and the other with executives of voluntary health agencies. Both of these are already at work on the preparation of their reports.

While no conclusion has yet been

* A.J.P.H., 32, 5:534 (May), 1942.

reached as to whether the certification of all public health personnel is a proper function of this committee, nevertheless serious consideration is being given to an interesting project developed several years ago by the Canadian Public Health Association for certifying sanitarians. We shall have more to report on this subject at a later time.

The Governing Council is not unfamiliar with the beginnings of the Merit System Study which have been reported at two previous meetings. The Governing Council, the Executive Board, and the Committee on Professional Education have all been emphatic about the importance of such a project in order that the present effort to implement merit systems in each of the states may not fail. It is a pleasure to report that during the last year this project has become productive and preparation of examinations in the first of the public health specialties has been undertaken.

Through agreement with the original sponsors of this project, the U. S. Children's Bureau and the U. S. Public Health Service, it has been decided that the Association should focus on the preparation of examination materials for use by the state merit system councils. With the assistance of several cooperating state health officers, and through the Conference of State and Territorial Health Officers, funds adequate for the first year have been made available for this project and the federal services have been generous in loaning personnel and providing other assistance.

Systematic work since the first of the year 1942 by a staff of subject matter consultants and a test technician has resulted in the preparation of an excellent list of items for public health nursing personnel which are now available to the number of about 2,000.

Even more important, however, has been the educational process by which members of the public health profession have become familiar with modern methods in personnel administration and in examination technics, so that groundwork has been laid by which items in many other fields can the more rapidly be prepared. Staff members of this unit are present at the Annual Meeting, prepared to counsel with those in the several states having responsibility in this field, and it is apparent that there will be a considerable demand for these services in the immediate future.

The attention of the Council is called to the fact that this procedure under the auspices of a professional society is unique and it is hoped that the quality of the resulting examinations will justify the confidence which the responsible federal agencies have placed in the American Public Health Association.

With the funds already available, and in anticipation of contributions to be made by the states that use the service, the committee plans to proceed with examination materials in the fields of administration, environmental sanitation, and the laboratory.

The Committee on Professional Education has pride in presenting this progress report of a very concrete service to the public and to the profession.

As the Committee on Professional Education enters its eleventh year, we do so with confidence in the future of professional education, not only for ourselves but for all those peoples to whom democracy is a cherished ideal. Again we are grateful that we have been given the opportunity to make some contribution to the lofty objective of this professional society—the protection and promotion of the public health.

W. P. SHEPARD, M.D., *Chairman*

Research and Standards*

THE year through which we have just passed has been one of increased activity for the members of the public health profession. Many of those who have served on this committee and who have contributed to the work of its subcommittees have been called to the armed forces. They have taken with them many of the technical procedures with which this Association can be credited and are making their benefits available to the war effort.

The Report of the Executive Board to the Governing Council has covered many of the items with which this committee is concerned. Among them are the extensive use by the Army and Navy of *Standard Methods for the Examination of Water and Sewage* and *Standard Methods for the Examination of Dairy Products*. The volume on *Diagnostic Procedures and Reagents* has been micro-filmed and flown to China for use in war areas. A new edition of this highly useful book is now being prepared and its scope will be extended by the addition of a number of referees who have been invited to prepare manuscripts.

You have already learned of the condensed version in Spanish of the volume on dairy products which is now under consideration. The *Report on the Control of Communicable Diseases*, to which we added our approval in 1940, is proving to be of great value in the emergency. *Recommended Practice for Design, Equipment and Operation of Swimming Pools and Other Bathing Places*, which this committee and the Governing Council approved at the last

Annual Meeting, continues to fill a real need. Plans are now well along for a new edition of *Standard Methods for the Examination of Water and Sewage*.

There is now before your committee a revised report on *Recommended Methods of Procedure for the Examination of Shellfish and Shellfish Waters*. In conformity with the policy of this committee, ample opportunity has been afforded to interested persons and groups to criticize and comment on the report, and we have provided for an open discussion of the subject at the committee's meeting here.

We are pleased to report that, at the suggestion of this committee, the American Standards Association has revised its specifications for drinking fountains to conform substantially with those adopted by this Association. This step will eliminate much of the confusion that has existed in the field.

The Standard Methods Committee for Frozen Desserts and Ingredients of the Laboratory Section has circulated widely new proposed methods, and if these meet with general approval they will be incorporated in the next edition of *Standard Methods for the Examination of Dairy Products*.

The study of autopsied deaths being conducted by the Subcommittee on Autopsies is continuing but, owing to lack of further funds, will have to be completed when fifty thousand protocols have been abstracted by the end of January, 1943. A second contribution of a statistical nature will be presented at this meeting at a session of the Vital Statistics Section.

During 1942, the Subcommittee on the Hygiene of Housing, under Dr. C.-E. A. Winslow's able leadership, has

* Report of the Chairman of the Committee to the Governing Council, October 26, 1942.

concentrated on two lines of work intended to develop needed administrative tools for public health departments and other official bodies concerned with housing: (a) completion of the technic for appraisal of housing deficiencies in low-grade urban areas; (b) study of principles and practice in the field of housing regulation under the law.

The results of the application of the recommended appraisal technic as applied in three test areas, one each in New Haven, Waterbury, and Stamford, Conn., have been published in the weekly *Public Health Reports*.¹ The technical secretary of the subcommittee will present the finished study at this annual meeting of the Association.² A statement on the essential principles of housing regulations under the law will be made by Professor Winslow at the current Association meeting.³

Other committee publications and research during the year have included the following: (a) "New Light on the Relation of Housing to Health," (b) a study of the performance of inexpensive heating units in two experimental houses of the John B. Pierce Foundation, (c) "Essentials of Space Planning and Space Organization in Dwelling Units," (d) the pilot study of family living functions as affected by contemporary housing design, conducted with the Pierce Foundation.

Agencies responsible for the Govern-

ment's war housing program have requested the subcommittee's advice or informal assistance in several matters during the year, including the revision of standards for war housing, the development of standards for dormitory types of temporary housing, and the formulation of housing standards for the billeting of war workers.

This completes the 13th year since the Committee on Research and Standards was established. While it has not occupied the broad field contemplated by some of those who outlined its charter, it has afforded a mechanism for bringing together at the Association level representatives of the several sections and of other organizations to consider technical matters of mutual interest. It has stimulated the formulation and constant revision of standards and of recommended procedures in the technical fields of public health, and served in a judicial capacity to advise the Governing Council concerning their endorsement by the Association. I believe that it should be continued.

KENNETH F. MAXCY, M.D.,
Chairman

REFERENCES

1. An Appraisal Technique for Urban Problem Areas as a Basis for Housing Policy of Local Governments. Report of the Subcommittee on Appraisal of Residential Areas, Committee on the Hygiene of Housing. *A.P.H.A. Pub. Health Rep.*, 57:285-296 (Feb., 27), 1942; also 57:485-501 (Apr. 3), 1942.
2. To be published in *A.J.P.H.*
3. *A.J.P.H.*, 32, 11:1263 (Nov.), 1942.

Eligibility*

THE Committee on Eligibility is representative of each of the ten Sections of the Association. The members serve for a period of two years, five being elected annually by the Sections and confirmed by the Executive Board. The Executive Board also appoints an additional Fellow to serve as Chairman. The duties of this committee are to pass upon the eligibility of Fellows, members, and other constituents in accordance with the provisions of the By-Laws.

In view of the fact that membership in the Association carries no voting privileges and because there are no professional qualifications for membership, it becomes necessary for the Committee on Eligibility only to make sure that no persons are elected to membership who could be said to be a discredit to the Association. The consideration of eligibility for Life Membership, for Sustaining Membership, and for Honorary Fellowship is not arduous. The important task of the committee relates to testing the eligibility of Fellows and of screening the applications for election of Affiliated Societies.

Two years have elapsed since the By-Laws of the Association were changed by the Governing Council to make more specific and more rigid the requirements for Fellowship in this professional society. The Committee on Eligibility has taken seriously the request of the Governing Council to test each application strictly by the provisions of the By-Laws. This is no mean task, involving as it does the review of well over a hundred applications after they have passed through the Section Councils,

and involving the exercise of considerable judicial discretion.

We note with interest the fact that raising the standards for Fellowship has not decreased the number of applications. Beginning with 1937, the annual number of Fellows elected was as follows: 60, 101, 77, 113, 123, and this year there are 139 applications. The average declinations by the Section Councils and the Committee on Eligibility has run about 8 per cent.

The number of membership applications last year totaled 1,034, of whom all were approved. This compares with the total of 836 for the previous twelve month period, an increase of nearly 25 per cent, contributing to the all-time high in Association membership.

At this meeting the Committee on Eligibility has reviewed the qualifications of 135 Fellowship applicants who had been previously approved for Fellowship by the various Section Councils and by the Executive Board, acting on applicants for unaffiliated Fellowship. Of this number, 133 have been approved by the committee, and their names appear on the list that has been furnished to each member of the Governing Council. It now becomes the function of the Governing Council to determine whether these individuals shall be admitted into the Fellowship of the American Public Health Association. The Committee on Eligibility after careful consideration recommends each of these names for your approval.

The committee has also approved six applications for Life Membership and the names of these applicants will also be found on the list before you. They are recommended for election to Life

* Report of the Chairman of the Committee to the Governing Council, October 28, 1942.

Membership by the Governing Council. Under our established policy this status is regarded in terms of its economic significance rather than in terms of an honorary significance.

The committee has carefully studied the routine for election of Honorary Fellows, and we are of the opinion that clarification is necessary in order to determine the proper place of the Sections in nominating individuals for this honor. The Committee on Eligibility recommends for consideration and approval of the Governing Council the following routine for the election of Honorary Fellows:

For persons who are members or Fellows of the A.P.H.A.

1. A resolution may arise from the Council of the Section with which a person is affiliated, or from the Executive Board, or upon the initiative of the Committee on Eligibility itself, suggesting the election of the individual as an Honorary Fellow. This resolution, in any case, to receive the consideration of the Committee on Eligibility.
2. The Committee on Eligibility considers the recommendation of the

Section Council or of the Executive Board and passes on its recommendation to the Governing Council for final action.

For persons who are not members or Fellows of the A.P.H.A., a resolution may arise from any Section Council, from the Executive Board, from the Committee on Eligibility, or from the Governing Council itself, but it shall be established as a policy that such recommendations shall be referred to the Committee on Eligibility for consideration before the individual is elected.

The Committee on Eligibility respectfully recommends to the Governing Council the election of the following persons to Honorary Fellowship in the Association:

William M. Frazer, O.B.E., M.D.

E. R. A. Merewether, M.D.

Sir John Boyd Orr, F.R.S., LL.D.

The Committee on Eligibility also recommends to the Governing Council that those persons in attendance at this Annual Meeting as invited guests under the auspices of the Pan American Sanitary Bureau be recommended for Honorary Membership.

DON W. GUDAKUNST, M.D.,

Chairman

American Museum of Hygiene*

ASSOCIATION COMMITTEE

EACH year since its appointment this committee has closed its report to this body with a recommendation that it be continued. This year, with great reluctance we omit that recommendation.

It will be recalled that we were appointed to promote the development of Museums of Health in America. Our progress has been previously reported. Museums of Health now exist in Cleveland and New York. Germinal interest in the establishment of museums in other cities has been submerged by the immediate necessities of war. Community leaders who in ordinary times could be counted on to advance the development of this newer instrument of health education have been called to other urgent tasks. Our committee members are similarly affected.

With two museums now established and the perennial concern of this Association in problems in health education, we can confidently assume that

when the present world difficulties have been resolved, and a new postwar era offers new opportunities for new enterprises, the Governing Council and Executive Board will be eager to establish a new committee to carry on and to capitalize on the pioneer efforts of this committee.

In thus recommending that the Association temporarily halt one of its most progressive undertakings, the committee records its appreciation of the support and coöperation which the Association has given to it at every step in the way.

LOUIS I. DUBLIN, PH.D., *Chairman*
 HOMER N. CALVER, *Secretary*
 BERTRAND BROWN
 JAMES A. DOULL, M.D.
 KENDALL EMERSON, M.D.
 BRUNO GEBHARD, M.D.
 VICTOR G. HEISER, M.D.
 SALLY LUCAS JEAN
 GUY S. MILLBERRY, D.D.S.

* Eleventh Annual Report to the Governing Council
 COMMITTEE ON AMERICAN MUSEUM OF HYGIENE
 Organized 1931. Published reports: *Year Books* 1933-1934, 1934-1935, 1935-1936, 1936-1937, 1938-1939, 1939-1940, 1940-1941, 1941-1942.

BOOKS AND REPORTS

Annual Book Review

MAZÏCK P. RAVENEL, M.D.

"Books are the legacies that genius leaves to mankind, to be delivered down from generation to generation, as presents to those that are yet unborn."—ADDISON

THE war has left its impress, not only on the number of books issued during the past year, but on their character. While there has been a great deal of writing on military topics, a large part of it has not yet reached the book stage. There have been some revisions of books particularly useful in wartime which have been brought up to date and some of the newer methods described. There have also been a large number of pamphlets issued by official bodies, most of them designed for instruction of the civilian population and the many war agencies which have been created.

As heretofore, our chief guide has been our own JOURNAL, but we have regularly examined a number of other journals, especially *The Lancet* and *British Medical Journal*. The valuations of the books mentioned are those given by the reviewers in one or more journals, often in the words of the reviewers.

BIOGRAPHY AND HISTORY

Under this heading there are a number of unusually interesting works many of which are timely. *Medical Work of the Knights Hospitallers of Saint John of Jerusalem*, by Edgar Erskine Hume, Johns Hopkins Press, is an excellent presentation of that remarkable body of men which has existed since the 11th century who made their way "across land and sea through the centuries protecting crusaders in medieval days or Spanish refugees today—any and all who needed help." Their hospitals were models for the world to follow; even in World War II one of their ambulance units was the first to come to the aid of the victims of "The Athenia." *Fatal Partners: War and Disease*, by Ralph H. Major, Doubleday, Doran, is particularly timely as pointing out some of the darkest lessons of war. The author is well known for his historical research. He admits that war provides for the doc-

tors a vast laboratory in which to study the practical effects of the application of their knowledge, but holds that war in itself has contributed nothing to medicine. One lesson the book teaches is that our Army Medical Library remains the most comprehensive and efficient repository of knowledge useful in medicine in the whole world. *The Golden Jubilee of the Association of Military Surgeons of the United States—A History of Its First Half Century, 1891-1941*, by Edgar Erskine Hume, Association of Military Surgeons, is, of course, of primary importance to the members of the Association of Military Surgeons, but should be of interest to all, since it shows the important part played by this Association in the development of military medicine, and especially its work for preparedness during the half century of the Association's existence. Historically it is also interesting as giving photographic cuts of all the Presi-

dents and editors of the journal published by the Association, and also some facsimiles of documents and title pages of documents of historical interest. The appearance of *The Life of Florence Nightingale*, by Sir Edward Cook, Macmillan, is peculiarly timely in view of the impetus which the present war has given to tropical medicine and to military medicine. The history of Florence Nightingale is always valuable reading for all classes of people. She has been referred to as the "mother both of military and of tropical medicine." *Doctors Anonymous, The Story of Laboratory Medicine*, by William McKee German, Duell, Sloan and Pearce, is a frank plea for the recognition of the pathologist whose work has such a foundational relation to every branch of the practice of medicine and yet whose name so seldom appears. This book is highly recommended to the profession as well as to the laity. *The Man Who Lived for Tomorrow*, by Wade W. Oliver, Dutton, is intended for a biography of the late William Hallock Park, who perhaps was the most beloved bacteriologist America has produced. In spite of some shortcomings, it is, so far, the best biography of Park which has appeared and can be recommended as a tribute to that widely known man. *The American and His Food*, by Richard Osborn Cummings, University of Chicago Press, is a systematic account of food habits during the past century. It is pleasingly written and can be recommended to physicians, health workers, nutritionists, nurses, and intelligent readers of all classes. *The Value of Health to a City—Two Lectures Delivered in 1873 by Max Von Pettenkofer*, Translated by Henry E. Sigerist, Johns Hopkins Press, shows vision, marshalling of all forces, medical and scientific, to prevent disease. It represents the work of a pioneer medical statesman. *Four Treatises of Theophrastus von Hohen-*

heim Called Paracelsus—Translated from the original German, with introductory Essays by C. Lillian Temkin, George Rosen, Gregory Zilboorg, Henry E. Sigerist—Edited, with a preface by Henry E. Sigerist, Johns Hopkins Press, can be highly recommended, and the translation is good. A name which always appears in medicine is that of Paracelsus, who was something of a mystic but quite an observer, and his observations are credited with being the origin of industrial medicine and hygiene. *The Doctors Mayo*, by Helen Clapesattle, Introduction by Dr. Guy Stanton Ford, University of Minnesota Press, gives an interesting story of the three Mayos—father and two sons, who made a tremendous impress on medicine in America. That part of the book concerning the elder Dr. Mayo is extraordinarily successful. That concerning the sons is too highly colored and some reviewers have regretted that publication could not have been delayed "until all the pigments could be employed." *Doctor Bard of Hyde Park*, by John Brett Langstaff, Dutton, is a story of one of the famous physicians of Revolutionary time—a man who saved Washington's life on one occasion. He was the first American to write seriously of diphtheria, 1771. Not only was he a leading physician but also a striking figure in the early history of this country. *Life and Teaching of Sir William Maccewen*, by A. K. Bowman, William Hodge, gives a history of the life, both physical and mental, of one of England's great surgeons, who was also a great teacher. In the last ten years of his life he gave distinguished war service and was also President of the British Medical Association. *Memorable Days in Medicine. A Calendar of Biology and Medicine*, by Paul F. Clark and Alice Schiedt Clark, University of Wisconsin Press, is useful as a book of reference for dates and biographies. *Source Book*

of *Medical History*, by Logan Clendening, Hoeber, is a compendium which spans the period from 1900 B.C. to 1895 A.D. It is a valuable book of reference, each chapter being preceded by a brief discussion of the period dealt with.

CHEMOTHERAPY AND SERUM THERAPY

The year has been noted for advances in chemotherapy, especially in the development of the "sulfa" drugs. The government has decreed sulfathiazole as a "must" treatment for gonorrhea in men in the services and there is continued use of some of the derivatives in the pneumonias. Most of this material is found in current journals and has not reached the book stage. However, we can report: *The Sulfonamide Compounds in the Treatment of Infections*, by Maurice A. Schmitker, Oxford University Press. This has been reprinted from Oxford Loose-Leaf Medicine. It gives the history, chemistry, and pharmacology of these compounds, also describes methods of administration, dosage, toxic effects, etc. It has brief reviews on other chemotherapeutic agents such as prontosil and its derivatives. It is not a treatise, but is sufficiently complete and accurate "to satisfy the harassed student, the busy practitioner, and the hurrying lecturer."

CHILD HYGIENE AND TRAINING

War conditions have made the care of children more than usually important if possible. There have been a large number of pamphlets and short articles on the various aspects of child care. Among the books which have appeared may be mentioned: *Delinquency Control*, by Lowell Juillard Carr, Harper. This is the outcome of a large experience and much study at the Michigan Child Guidance Institute. The book is a good guide and an inspiration to anyone seeking practical

suggestions. From the public health concept it treats not only of control but of prevention. *Solving School Health Problems*, by Dorothy B. Nyswander, The Commonwealth Fund, is a "must" book for health officers, school superintendents, and directors of school health services. It is the outcome of four years of intensive study in New York City. *The Family in a World at War*, edited by Sidonie Matsner Gruenberg, Harper, deals with the various phases of family life in relation to the war emergency and national defense. The "Children's Charter in Wartime" has been prepared by a Commission on Children in Wartime of the U. S. Children's Bureau. The book can be thoroughly recommended for wide reading, especially at this time. The editor is to be congratulated in bringing together such useful material when the preservation of the family is of paramount concern. The origin of the book and the various organizations which have taken part in its production as well as the names of the special authors assure one of its value as well as its validity. *Developmental Diagnosis—Normal and Abnormal Child Development*, by Arnold Gesell and Catherine S. Amatruda, Hoeber, cannot fail to have a profound influence upon methodology in the study of young children and upon the supervision of their health and development based upon exact and exhaustive observations. It is of more than passing interest and will serve as a volume of reference for some time to come.

ENGINEERING

Engineering has always been one of the most useful branches of public health. We are especially dependent on the engineers in this time of war not only in protecting our men in the field, but also for conserving the health of the civilians at home. *Refuse Collection*

Practice, by the Committee on Refuse Collection and Disposal, American Public Works Association, is the first comprehensive treatise on this subject since 1921. It is complete and authoritative. *Water Purification for Plant Operators*, by G. D. Norcom and K. W. Brown, McGraw-Hill, is an instruction book for performance of routine duties by plant operators. It is a useful book in its field. *Public Works Engineers' Yearbook 1942*, American Public Works Association, contains more than 30 authoritative articles on subjects in which every engineer is interested. Both administrative and technical aspects of the problem are discussed. It can be recommended highly for administrators, libraries, public works engineers, and officials.

HEALTH EDUCATION

It has been pointed out many times that if we could convince the public of the truth and daily importance of facts which are already well known and abundantly proved, thousands of lives and much illness could be saved, and this means that in the aggregate many thousands of man power days could be added to our production. We therefore welcome *Health Education of the Public*, by W. W. Bauer and Thomas G. Hull (2nd ed.), Saunders. New chapters have been added, including one on Philosophy of Health Education and one on Training and Qualifications. This second edition of a well known book will give valuable assistance and stimulus to all interested in public health.

HOUSING

Housing has a special interest on account of the conditions in the country, the moving of great numbers of men with their families to centers of manufacture, ordnance, etc., with new settlements partaking of the nature of villages and towns springing up in

widely separated areas. *Housing Yearbook—1942*, National Association of Housing Officials, Publication No. N 159, is a valuable compilation of articles on housing progress by various authorities. It is useful in considering the changes brought about in connection with housing agencies and activities by the federal authorities, the Navy, etc. Although omissions have been made on account of economy, the book is a standard for all interested in this subject.

IMMUNITY

With the men of our armed forces being scattered to the four corners of the earth, immunization against various diseases has become a prominent feature of preparedness. It is rather surprising that we have only one book to report: *Immunization to Typhoid Fever*, by Colonel J. F. Siler and others, Johns Hopkins Press. This covers seven years' experimental studies made in the Army Medical School research laboratories and is an outstanding contribution to our knowledge of immunization against typhoid fever. There is nothing else like it in this country.

INDUSTRIAL HYGIENE

This is another subject the importance of which has been greatly increased on account of war activities, with its multitude of new processes, new chemicals and combinations, all of which are closely related also to the housing problem and migration of workers. *Occupational Diseases*, by Rutherford T. Johnstone, Saunders, is useful to the general practitioner as well as specialists in the field of industrial medicine. Its publication is very opportune in this time of national emergency. *Eye Hazards in Industry*, by Louis Resnick, Columbia University Press, has been published for the National Society for the Prevention of Blindness and is timely in view of the

increase in industrial accidents during the last two years as reported by the Bureau of Labor Statistics and the National Safety Council, which say that 300,000 eye injuries occurred yearly in industrial fields, costing employers and the injured workmen more than a hundred million dollars. It is held that only 2 per cent of this enormous loss may be considered as unavoidable. The book can be highly recommended.

MENTAL HEALTH

We have not seen any outstanding new book on mental health. However, the selection of men for all of the services has been more exacting and the training periods have in view the prevention, as far as possible, of some of the breakdowns always seen at such a time as this.

NURSING

We might well have put the biography of Florence Nightingale under this heading. No one needs to be told of the importance of nursing and the part nurses play in a war. A very timely book is: *The Public Health Nurse in Action*, by Marguerite Wales, Macmillan. The author reaffirms her belief in the importance of the work of the public health nurse, calling her "a galvanizing agent." This is a most interesting and valuable presentation of the whole subject. *Nursing: An Art and a Science*, by Margaret A. Tracy (2nd ed.), Mosby, has been revised with the object of making it more useful as a textbook for student nurses. It can be recommended for use in schools of nursing and as a reference book for public health nurses. *Nursing: A Community Health Service*, by Amelia Howe Grant, Saunders, will serve the needs of many groups and individuals, and especially graduate nurses preparing for public health nursing and for

students in the basic nursing education programs of study.

NUTRITION

There is no need to stress the importance of good nutrition at this time. The slogan of the first World War was "Food will win the war." Now there seems to be no question that we are using food not only to win the war but to win and hold friends in practically every part of the world. The tremendous demands taxing our resources make the whole subject of great importance. The following books have been reviewed: *Nutritional Deficiencies*, by John B. Youmans, assisted by E. White Patton, Lippincott, was written primarily for practitioners. It should be read by all physicians and particularly teachers of medicine and nursing. The book can be recommended as an accurate and authoritative source of information. *We Need Vitamins*, by Walter H. Eddy and G. C. Hawley, Reinhold, is one of the best books on vitamins—accurate and written in non-technical language so that the average lay person can understand it. So many things are being learned about nutrition and the vitamins that a book is scarcely printed before it becomes more or less out of date. However, this book can be recommended without reservation, especially for dietitians, though all doctors will find much of value in it. It should be a wholesome tonic against the reckless exploitation of vitamins which is going on in this country. *Modern Bread from the Viewpoint of Nutrition*, by Henry C. Sherman and Constance S. Pearson, Macmillan, is by one of the best known authorities and brings the matter up to date. Modern bread is very different from what "mother used to make." It is almost all "enriched" with an eye on mineral and vitamin content as well as the calories per pound. The book should have wide reading.

Food and Drug Regulations, by Stephen Wilson, American Council on Public Affairs, gives a complete story of food and drug legislation of the federal government. The book gives important facts, incidents, and excerpts of the bitter debates leading up to and through the passage of the Federal Food and Drug Acts of 1906 and 1938. A whole chapter is given to the history of food and drug legislation from the days of the Athenians and Romans to the passage of Pure Food and Drug Act of 1906. *Chemistry and Physiology of the Vitamins*, by H. R. Rosenberg, Interscience Publishing Company, is perhaps the most complete record of work done in the field of vitamins up to 1942. The subject matter is "critically and comprehensively appraised from chemical, physiological, nutritional, and industrial points of view. The book "should be heaven-sent to teachers of biochemistry, nutritionists, clinicians, and even to vitamin-plagued laymen." *The Biological Action of the Vitamins*, edited by E. A. Evans, Jr., University of Chicago Press, contains the fourteen papers presented at the symposium on The Biological Action of the Vitamins, held in connection with the 50th anniversary celebration of the University of Chicago in 1941. It is the best single source of information on these aspects of the vitamins now available. *Tables of Food Values*, by Alice V. Bradley, Manual Arts Press, is extremely useful to both scientists and lay persons concerned with the vitamin and other nutrient values of food.

ORAL HYGIENE

Oral hygiene is another subject of great importance at all times but being emphasized in examination of men for the armed services. Napoleon said: "An army travels on its belly." With almost equal truth it travels on good teeth, as they play such an important part in nutrition. The output of books

on the subject is again scant for this year, and we can mention only: *Professional Dentistry in American Society*, by Alfred J. Asgis, Clinical Press. The author considers the relation of the profession to society at large and emphasizes some of the responsibilities of one to the other. It is particularly recommended to health workers who are not dentists as stressing the integration of dental activities in a general public health program.

PARASITOLOGY

It may become tiresome to our readers to repeat so much and perhaps we should have headed the general article by saying that all the topics considered are of more than usual interest at this time. It is true, however, that certain subjects have been brought to the fore by the fact we are waging a world war, and for the first time in our history we have three branches of the service—Army, Navy, and Marines — with the necessary nurses and lay personnel, living in the tropics under conditions which are new, not only to our forces but to practically every American, except here and there an explorer. From all accounts the average person has no conception of what insects generally, and parasites in particular, mean to soldiers in the jungles—the South Sea Islands, for example. *Textbook of Clinical Parasitology*, by David L. Belding, Appleton-Century, is a comprehensive and reliable reference for those dealing with animal parasites and the pathological conditions produced. It can be thoroughly recommended to students of tropical medicine, medical men, and laboratory workers.

PUBLIC HEALTH

There have been few notable books on public health as such. However, some useful ones have appeared as well as some new editions and a number of

articles treating of the various subjects which pertain in one way or another to health. We can mention particularly: *Handbook of Communicable Diseases*, by Franklin H. Top and Collaborators, Mosby, which is a convenient compendium for health officers, interns, medical students, and nurses. *Encephalitis: A Clinical Study*, by Josephine B. Neal and Associate Authors, Grune and Strattan, surpasses the expectation of the most critical reader. It contains a wealth of information on each individual type of the large group of known encephalitides. There are more than a hundred selected case histories and 600 references arranged in sequence at the end of each subchapter. It is a "must" book for every library and public health worker, written in clear style, and set in beautiful type. The book fulfils a need that has long existed in medicine and public health. *Communicable Disease Control*, by Gaylord W. Anderson and Margaret G. Arnstein, Macmillan, is designed especially for health officers and public health nurses. It is written from the wide experience of the authors and is a useful summary of American practice, bringing together in a unique manner the functions of the health officer and public health nurse. It can be highly recommended to all workers in communicable disease control.

PUBLIC HEALTH AND THE WAR

This year we have used this heading, as a number of publications, mostly pamphlets or leaflets, have appeared under competent authority, devoted to war work. We can recommend: *Handbook for Civilian Defense*, by H. Mayer-Daxlanden, Civilian Advisory Service. Throughout a large part of the country the excitement over air raids seems to have passed; however, there is still reason for preparedness. In 1941 the Rose Bowl game and other gatherings were cancelled. In 1942 all

the Bowl games took place, and we do not hear nearly so much of defense against air raids. The reviewer of this pamphlet recommends also, *Civil Air Defense*, by Lt. Col. A. M. Prentiss, of the U. S. Army; also more recent publications of the U. S. Office of Civilian Defense, the *Handbooks, Textbooks, Planning and Training Guides*, and *Bulletins*, British Library of Information, 30 Rockefeller Plaza, New York. *Preventive Medicine in Modern Practice*, edited under the auspices of the Committee on Public Health Relations of the New York Academy of Medicine, Hoeber, contains chapters written by a number of men, all experts in their respective fields. It is a discussion of the problems of preventive medicine which are "encountered by the physician in his daily practice, and in so far as possible, the presentation of solutions of these problems." It is authoritative. *War Gases*, by Morris B. Jacobs, Interscience Publishers, is most timely and especially useful to all concerned in civilian defense. With the possibility of the use of poison gases in the present war, defense against chemical war agents grows in importance. *Digest of State and Federal Laws Dealing with Prostitution and Other Sex Offenses*, compiled under the direction of Bascom Johnson by George Gould and Roy E. Dickerson, American Social Hygiene Association, shows the confusion which exists both in legislative bodies and among the public. It contains much practical knowledge of the means of prevention. This digest is of especial value to public health workers, legislators, and research workers. *Fundamentals of Anesthesia: An Outline*, by Subcommittee on Anesthesia of National Research Council, American Medical Association Press, discusses at some length in outline form the question of complications, as well as comfort and transport of the wounded. War gases are also named and dis-

cussed. *The Management of Fractures, Dislocations and Sprains*, by John Albert Key and H. Earle Conwell (3rd ed.), Mosby, is excellent and should be in the library of every physician and surgeon, especially during wartime. In the present edition extensive changes have been made and other chapters rewritten to bring the subject matter up to date. *War Injuries of the Chest*, edited by H. Morriston Davies and Robert Coope, E. and S. Livingstone, is a sound expression of thoracic practice at the present time. The chapter on anesthesia is able. *Surgery of Modern Warfare*, edited by Hamilton Bailey (2nd ed.), Volumes I and II, William Wood, represents British surgery at its best, depicting actual wartime surgical practice. The volumes are beautifully and lavishly illustrated. The illustrations alone are a liberal education in modern surgery. It would be hard to pick any one section which is better than the others, but "Shock and Its Treatment," "Skin Grafting in Wounds Involving Skin Loss," "Wounds of Arteries," and "Wounds of the Face and Jaws" are outstanding. Such practical and efficient directions on important phases of the treatment and management of wounds of the face, jaws and neck are seldom found. "This book depicts a new world in war medicine and surgery." *After-Treatment*, by H. J. Atkins, Blackwell, is especially good in its emphasis on human side of treatment and the common-sense approach to problems of convalescence. It is one of the best and most attractive on the subject. *The Blood Bank and Technique and Therapeutics of Transfusions*, by Robert A. Kilduffe and M. DeBaakey, Mosby, covers a wide scope. It is a good history of the subject, is well produced, and informative. The appearance of this book is timely. *Medical Manual of Chemical Warfare*—Including also An Atlas of Gas

Poisoning, Reprinted by Permission of the Controller of His Britannic Majesty's Stationers Office, Chemical Publishing Company, Inc., is an official release from the British office. Its value is enhanced by the inclusion of plates in colors. It is heartily recommended as an authoritative guide in the handling of a destructive agent of war with which we have so far not had to deal. *War Medicine. A Symposium*, edited by Winfield Scott Pugh, Philosophical Library, Inc. This book is a collection of outstanding articles on military medicine grouped in three sections: surgery, aviation and naval medicine, and general medicine. The articles for the most part are by English and American authors, either given entire or are abstracted. The material is concise and factual. There are articles on certain parasites and on problems in psychiatry peculiar to military personnel. The book deserves study by physicians engaged in military medicine and civilian physicians in private practice who expect to enter the service.

TEXTBOOKS AND NEW EDITIONS

Textbooks and new editions are always looked for with interest. A revised edition is often better than the original, and should be, as most authors take advantage of the criticisms and suggestions by reviewers. The following may be mentioned: *Personal Hygiene Applied*, by Jesse Feiring Williams (7th ed.), Saunders, has been fundamentally revised and brought up to date, containing new sections on vitamins, specific diseases, etc. It is an excellent and standard book. *Standard Methods for the Examination of Dairy Products* (8th ed.), American Public Health Association, is the culmination of 36 years of study by specialists, and has been brought up to date. It is indispensable. *Stitt's Diagnosis, Prevention and Treatment of Tropical*

Diseases, by Richard P. Strong (6th ed.), Blakiston, is particularly welcome to all interested in this field of medicine which is of so much importance to our national defense in the present war. Its appearance at this time is most welcome and it should be in the possession of all medical libraries, teachers of the subject, and medical units in the armed forces. *Industrial Surgery*, by Willis W. Lasher (rev. 1st ed.), Hoeber, is an excellent book which covers the whole field of industrial surgery. It is especially to be recommended at this time when industry is geared for the tremendous war effort, and industrial surgery is a most vital subject. It is recommended therefore not only to those specializing in industrial medicine but to the general practitioner as well. *The Modern Treatment of Syphilis*, by Joseph Earle Moore (2nd ed.), Thomas, is a valuable compilation of the literature. Apart from the actual treatment, this book gives advice concerning the venereal disease control officer, "who should combine in himself public health experience and a wide clinical knowledge of syphilis." It is especially timely when the venereal disease question is playing such a large part in the making of our army. *Handbook of Hygiene*, by Joseph W. Bigger (2nd ed.), Williams and Wilkins, is presented in a clear-cut, concise manner and the material is well arranged. The first edition was well received, and the second maintains the standard and is brought up to date. *The Sanitary Inspector's Handbook*, by Henry H. Clay (5th ed.), H. K. Lewis & Co. A book that has reached its fifth edition in ten years must have something a little better than usual. The author is a Major in the R.A.M.C. This wartime edition includes a special reference to "conservancy" and to camp and rural sanitation, bringing the material up to date. While written from the English standpoint, every edition of the book

has had good reception in this country. This one has an introduction by Sir Wilson Jameson, who points out that the sanitary inspector has become more highly specialized and technical within the British Empire than anywhere else in the world. *Community Hygiene*, by Smiley and Gould (3d ed.), Macmillan, is a standard book streamlined and brought abreast of the times, and is excellent.

TUBERCULOSIS

Tuberculosis is always with us, and already there are signs of an increase in the incidence of the disease due to war conditions. *The Story of Clinical Pulmonary Tuberculosis*, by Lawrason Brown, Williams & Wilkins, is to be especially recommended. Published posthumously, it is by one of the masters in the study of tuberculosis, a victim of the disease himself. Containing much history, it is much more than a story of tuberculosis. Dr. Brown was almost as well known in connection with Saranac Lake as was Trudeau, the founder. Always a careful student, few men have ever been more widely beloved. The book will be useful to all physicians, whether specialists or not. *Tuberculosis in Industry*—Report of the Symposium Held at the Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, N. Y., National Tuberculosis Association, is a timely book in view of the pressure under which industries are now operating. Reduction in deaths in the industries has paralleled that in the general population. It is fifth in importance of all diseases and accounts for 6.5 per cent of deaths among workers. Under the etiology of tuberculosis silicosis was naturally considered. Only those dusts high in free SiO_2 are known to alter appreciably the susceptibility to tuberculosis. Education was stressed and early case discovery is regarded as the key to prevention.

MISCELLANEOUS

There are always a number of books which are hard to put in one little compartment so we have taken the best of them and put them under the meaningless title of "Miscellaneous." The following can be recommended: *Strange Malady*, by Warren T. Vaughan, Doubleday, Doran. This is a history as well as a discussion of allergy with only a brief section devoted to treatment. Certain reviewers believe that the book is misleading in that it states sensitization to foods is the commonest form of human allergy. Experts in allergy and in internal medicine will be inclined to criticize this statement. With this exception the book is up-to-date and correct. It is well written and the illustrations, while amusing, portray accurately many of the complicated problems of immunity. *Administrative Medicine*, edited by Haven Emerson, Nelson, combines treatment of the field of public health and medical care in one volume, and under a new name. Fifty-six authors have taken part in the making of this book. The section on public health will prove particularly attractive for readers of this JOURNAL, though there is something for all interested in public health from any standpoint. It is a real contribution to the scant literature of the subject. *The Anaerobic Bacteria and Their Activities in Nature and Disease* (A Subject Bibliography), by L. S. McClung and Elizabeth McCoy, University of California Press, is Supplement I Literature for 1938 and 1939. It is a book necessary for all libraries and should be in all medical schools. *About Ourselves*, by James G. Needham, Cattell Press, is an unusual book, written by a biologist. It is pessimistic inasmuch as he says that man is so much of an animal that war appears to be inevitable. It is a most useful book for study by all educated people who wish to know more about that curious com-

plex we call "homo sapiens." *Speaking of Man*, by Michael F. Guyer, Harper. At first sight one might wonder why a book by a biologist should be especially useful at a time like this, but both the author of *About Ourselves* and this book refer to war and describe man as belonging to the fighting animals. Guyer says: "And since war is outstandingly a biological phenomenon the biologist's views concerning struggle in nature, about competing social systems, and above all, regarding that combative social animal, man, may be worth considering by thoughtful folk who seek a peaceful world. As is true of practically all animals where the male is the larger, stronger, better armed and more highly ornamented, man is by nature a fighter." *Behind the Mask of Medicine*, by Miles Atkinson, Scribner, an unusually good study of the many problems which confront the physician in his practice, considering them from the historical, religious, sociological, and practical points of view, which should be in the library of every physician. It would be well if the public could be induced to read it widely. The author "inculcates the highest standards of conduct under every circumstance which may confront the doctor either as a physician or man." *The Microbe's Challenge*, by Frederick Ebersson, Jacques Cattell Press, is an unusually well done popular story of bacteriology and many of its accomplishments. It is one of the best summaries of the subject matter which has ever been written. *Rabies*, by Leslie T. Webster, Macmillan, intended for students, research men, physicians, and veterinarians, though especially designed for those having some knowledge of the disease, who should in turn, pass it on to the laity to dispel the superstitions and myths which are so widely spread. Apart from its scientific character and the result of the author's research, the

book contains in addition much good sense and a lot of practical knowledge.

Any attempt to select books for special attention will be immediately subject to attack. Omissions of certain titles will be regarded as serious by some; others will feel that one or another book is distinctly not worthy of

mention. Criticism of over-emphasis on one category and neglect as to another may be expected. While the selections in this article are the writer's, the comments in the majority of instances are the reviewers'. The combination, we trust, will not prove too unhappy.

Annual Report of the Commonwealth Fund for the Year Ending September 30, 1942. 62 pp.

This 24th annual report of the Commonwealth Fund records a moving story of the efforts made "To do something for the welfare of mankind" in conformity with the declared purpose of the Fund. Disbursements during the year exceeded \$1,937,000 and again the greater part of the available income has gone through various channels into the promotion and conservation of health. Besides making substantial contributions to several war funds, continuing the medical research for which the Fund has long been known, and promoting interest in medical education and in mental health, the Fund once again has made direct investments in public health and health studies. A unique feature lies in the field units of specially trained staff made possible in Tennessee, Mississippi, and Oklahoma to afford a mobile resource which must be of immense tactical value to state health officers in these days.

The Fund has continued grants to rural hospitals and to international fellowships, fifteen of which went to Latin American Fellows last year. Among the books published by the Fund are two of especial interest in public health, *The Modern Attack on Tuberculosis*, by Chadwick and Pope, and *Solving School Health Problems*, by Nyswander. Many a health officer who reads this report will wish that he

were as free to direct his efforts into fruitful channels with long-range promise as the officers of the Fund have been. The public health profession will agree that the hope of the future lies in the kind of strategy which underlies the work described in this report.

REGINALD M. ATWATER

Communicable Diseases—By Nina D. Gage and John Fitch Landon (3rd ed.). Philadelphia: Davis, 1942. 458 pp. Price, \$3.50.

The third edition of *Communicable Diseases* by Gage and Landon carries the same high standards as the first two. There are added sections on tetanus, the differential diagnosis of communicable diseases characterized by exanthematous eruptions, and on the home care of the communicable disease patient. To those who are not familiar with this book it should be stated that there are many appropriate illustrations which in the main are very well done. A few of the color plates could be improved by the natural color processes now available.

The format of the book is excellent. An outline of the subject matter of each section is followed by a discussion of the medical consideration, the methods of control, and the nursing care. This orderly arrangement is helpful when using the book for reference.

The chapter on the sulfonamides has been revised and gives practical information as to the type of the drug to

be used and dosage for the various diseases. Minor misstatements regarding the availability of sulfathiazole in the section on gonorrhea, and regarding the specificity of sulfanilamide in the treatment of gonorrhea in the section on chemotherapy are mentioned by the reviewer but are not of great importance, since the book has been prepared for the primary purpose of instruction in the nursing care of communicable disease.

The section dealing with the Commoner Communicable Diseases, such as diphtheria, scarlet fever, measles, and whooping cough, is well written and gives a particularly clear picture of the clinical as well as nursing aspects of the diseases described.

WILTON L. HALVERSON

Community Workshops for Teachers in the Michigan Community Health Project—*By Henry J. Otto, et al. Ann Arbor: University of Michigan, 1942. 303 pp. Price, \$2.00.*

This book describes a pioneering experiment in organizing and conducting four workshops for in-service training of teachers during the summer of 1941 by the University of Chicago and the University of Michigan, aided by the Kellogg Foundation. The workshops dealt respectively with the following problems: health education; science education; democratic citizenship and the health of children and problems in social science, library science and the language arts.

A unique feature of the plan is the "grass roots" approach which was used. The workshops were conducted in four local communities within a seven county area. Teachers helped determine the problems for attention and had an active part in daily program planning. Emphasis was placed on meeting local needs through more effective use of local resources. Thus the local

health personnel were important resource people in the health education workshop and the local health problems important aspects for study.

Among the activities described are work in the laboratory school, field trips, individualized study, group discussions, and coöperative projects with community groups. Emphasis was placed on the practical application of theoretical concepts in community living. The book is well illustrated.

The growing pains associated with this newer approach are revealed with frank objectivity. The evaluation of the workshops by the teachers themselves shows a gratifying satisfaction with the informal program.

Adaptations of the methods used may be one practical answer to in-service training under present wartime conditions. Local departments of health and education and teacher training institutions should find help in this book on ways in which they can stimulate and assist in similar training programs so that more teachers are made ready to take greater responsibility for school and community health work.

RUTH E. GROUT

Extra-mural Teaching of Preventive Medicine and Public Health—*By Alfred Korach, M.D., with a preface by T. J. LeBlanc, M.D. Medical Bulletin of the University of Cincinnati, Vol. IX, 1942. 143 pp.*

Public health workers, as well as medical educators, have become increasingly concerned with the need for greater emphasis in the medical school curriculum upon the prevention of illness and upon the influence of social, economic and other environmental factors in the occurrence of disease. It has also been recognized that the undergraduate medical student should be made familiar with the community health resources which assist and supplement the efforts of the private prac-

itioner in the treatment and prevention of disease. It is with these phases of medical education that this volume deals. Particular attention is given to field instruction which the authors consider as the *Extra-Mural Teaching of Preventive Medicine and Public Health*.

No claim is made that the program of teaching in the Department of Preventive Medicine of the University of Cincinnati College of Medicine is the best or only way to approach the problem. In fact, the extensive outline and analysis of the required and elective course of instruction for sophomore medical students followed since 1939 is offered as a guide and a source of reference for others faced with the task of planning curricula with similar aims. Dr. LeBlanc and Dr. Korach are to be commended for their presentation. Ample space is devoted to student comments upon this experience and a valuable bibliography of authoritative references is appended to the text.

T. D. DUBLIN

Hospital Discharge Study—Hospitals and Hospital Patients in New York City (Vol. I)—By Neva R. Deardorff and Marta Fraenkel. *New York: Welfare Council of New York City*, 1942. 209 pp. Price, \$1.00.

Since Dr. Bolduan first pointed out the importance of collecting hospital morbidity statistics in 1913, a great deal has been written about the problem but few actual reports on the collection of material have appeared. This volume, the first of three, is of importance since it represents the first contribution to this field which includes almost complete data on hospitalization in an urban center for an entire year.

The Welfare Council of New York City, with the assistance of state and city work relief authorities and the WPA, initiated the survey on January 1, 1934. Of a total of 134 hospitals under voluntary and municipal control,

offering general and special service of any kind, and institutions for the chronically ill in New York City (excluding proprietary, federal and state hospitals) 113 hospitals with 88 per cent of the total number of beds participated in the study; 576,623 discharges representing 546,235 persons occurred in these hospitals in 1933.

This first volume contains a summary and description of the general characteristics of these patients including demographic data, and discussions of migration for hospitalization, diagnosis and mortality, financial status, length of stay and readmissions. The text is supplemented with 58 tables and 12 appendices. In addition, there is a carefully selected bibliography on morbidity and methods of measuring morbidity.

The detailed study of diagnosis and morbidity is to be published in the next two volumes. Information of this type, together with material now available through Hospital Service Plans, is needed for adequate and proper planning of future hospitalization.

EDWIN L. CROSBY

The Lives and Loves of Huber the Tuber—By Harry A. Wilmer, M.D. *New York: The National Tuberculosis Association*, 1942. 83 pp. Price, \$1.00.

A riotously gay tale of a tuberculous bacillus and his friends. The entire gang are so personalized as to become real creatures battling against Monosights.

In a most realistic fashion, Huber accompanied by his troops, like Alice falling down the hole to Wonderland, slipped into the bronchial tube to invade the lungs of a human—then the war begins—the gang launching their treacherous work against Monosights. Each stage of the struggle occurring in the lung is graphically described in words as well as in unique illustrations. Few there are so uninformed as to miss

the lesson conveyed throughout the drama.

Lungland becomes a friendly territory attacked by enemies without. All of these characters are identified with whimsical titles suggestive of the day, Rusty the Bloodyvitch, Huey the Long Tuber, Gobbles, Gorrington, Takiotuber. Chief of the Monosights is Corpuscule Lipsky, whose entire army become the Signal Corps, Military Police, Mechanized Forces, Infantry, Engineer Corps, etc.

A brief description in a serious vein is offered with each act and also in a summary presented as a preface. The only weakness in this delightful contribution is the author's failure even to hint at the time element involved. It all seems to happen in a brief period, a day or even an hour. Perhaps that was the author's intention as the period of invalidism required for the success of Monosights requires patience and persistence to endure the enforced rest necessary in combating Huber the Tuber.

Dr. J. Arthur Myers in the introduction to the book gives a glimpse of the remarkable character and unconquerable spirit of the youthful author who wrote and illustrated the book during months of leisure due to a tuberculous bacillus.

"Dr. Wilmer did not become discouraged because of his fate but rather he saw an opportunity to enter into the great campaign against tuberculosis, which otherwise probably would not have presented itself. The tubercle bacillus had suddenly caused a termination of his hospital work; it had seriously interrupted his plans, but almost as though nothing had happened, or as though it had been planned for years, he took up another phase of health work and has pursued it diligently."

This slim volume of 80 pages, with the author's distinctive drawings, is well printed on good paper. The book

can be heartily recommended for old and young. Here's hoping it will become not only a best seller but may be used as the basis for a motion picture.

SALLY LUCAS JEAN

Nutrition and Diet Therapy—By Fairfax T. Proudfoot (8th ed.). New York: Macmillan, 1942. 1,057 pp. Price, \$3.25.

This edition, published in June, 1942, represents the first revision of this popular book since September, 1938. In a science such as nutrition where scientific research is adding new material at such a rapid rate, it is obvious that a book on this subject needs frequent revision. It is also the obligation of the author to keep the volume of material under reasonable limitation in spite of the new additions being made.

The organization of this edition is practically the same as that of the seventh except that an additional section has been added to include the nutrition and feeding in pregnancy and lactation as well as the feeding of children of different ages. One-fifth of the book is given over to the fundamentals of nutrition, and a little less than 100 pages each to feeding in obstetrics, lactation and children of different ages and to laboratory lessons. The last 600 pages are occupied with Diet Therapy and Recipes. The author well points out that in the hospital the doctor gives the diet orders and the student carries them out. Patients as a rule do not understand the common rules governing nutrition and, therefore, in order to gain their full coöperation it is necessary to explain things to them. The student, consequently, needs training in order to perform these tasks efficiently.

It is to be regretted that the author did not see fit to devote some of the space given to cookery, and other subjects more related to the field of home economics, to such subjects as nutri-

tional field surveys, food rationing, reinforced bread, meat substitutes, and other nutritional matters growing out of federal food supervision as a defense effort.

Nevertheless, the book has proved its value in previous editions and the present one is well up to standard. The author is well known and her presentation of material is extremely practical.

IRA A. MANVILLE

Standard Nomenclature of Disease and Standard Nomenclature of Operations—By Edwin P. Jordon, Editor. Chicago: American Medical Association, 1942. 1,022 pp. Price, \$4.00.

This volume consists of the third edition of the *Standard Nomenclature of Disease* and the first edition of the *Standard Nomenclature of Operations*.

Changes from previous editions of the text on disease nomenclature include: (1) about 3,500 additions, deletions and corrections to individual diagnostic items; (2) the printing in bold face type of some of the more frequently used terms; (3) exclusion of numbers corresponding to those in the *International List of Causes of Death*; (4) the addition of a table of eponymic diseases, and (5) the omission of *Classified* from the original title. The section on operations is an attempt to set up a standard terminology similar in its arrangement and usefulness to the one on diseases.

Despite the wide acceptance of the Standard Nomenclature by many well known physicians and prominent hospital groups and its sponsorship by the American Medical Association, many students of nosology and the problems of medical nomenclature question the advisability of its widespread use either in the teaching of standard diagnostic terms or in quantitative medicine as a classification of disease entities. Some of the arguments offered are:

(a) No standardization of diagnostic entities can be agreed on completely without first defining each term and using it only when it both denotes and connotes precisely a meaning understood by all competent physicians. This would be hard enough for the well defined clinical entities, but when attempted for the poorly defined ones, it becomes almost impossible. Standardization also precludes the use of synonyms and eponyms.

(b) The present anatomic and etiological classification is eminently satisfactory for certain diseases, but often becomes quite complicated, particularly in the specialty fields.

(c) The numerical coding system is too complicated to be used satisfactorily either as a diagnostic cross index or as a means for tabulating diseases for statistical purposes. In addition, the time and study necessary to employ the system intelligently is often more than the casual user can afford.

EDWIN L. CROSBY

The Standard of Living in 1860—By Edgar W. Martin. Chicago: Chicago University Press, 1942. 450 pp. Price, \$4.50.

It is the secondary title "American Consumption Levels on the Eve of the Civil War" that best reveals the purpose and content of this interesting source book. Apart from the introductory and concluding chapters, the book consists of eleven topical collections or catalogues of well documented facts which may prove useful to students of economic history, but only inferentially indicate standards of living in the intellectual, ethical, or professional spheres.

There are some 49 tables of costs, consumption, prices, family budgets, wages, population, and similar matters. Documentary footnotes are abundant.

In only one chapter (VIII) of 78 pages is there any information directly

related to health either personal or public, and most of this is dedicated to the quantity and quality of the practice of curative medicine.

No one at all familiar with the scene of medicine or public health will find any facts or ideas in this chapter at all novel in substance or form.

The book will satisfy a curiosity of those who are entertained by turning the pages of a relatively recent past, when there was little notable or inspiring in the American practices of earning and spending and saving and wasting.

This book will probably be found useful as a storehouse of facts. Their interpretation and bearing upon levels of living is not included to a noticeable degree in the text.

The conclusion would seem to have been predictable that the "American Standard of Living" included more goods producible in a mass manner than was the case among Europeans.

The index is well done.

HAVEN EMERSON

Virus Diseases—By Members of the Rockefeller Institute for Medical Research. Ithaca, N. Y.: Cornell University Press, 1943. 170 pp. Price, \$2.00.

This volume is only 170 pp. long and covers certain phases of the virus field. The following six articles constitute the entire work: Virus Diseases with Particular Reference to Vaccinia, Chemical Structure and the Mutation of Viruses, New Hosts as a Key to Progress in Plant Virus Disease Research, Swine Influenza, Human Influenza, and Viruses and Tumors.

Obviously a volume of this size cannot hope to cover the entire field of virus diseases, nor are any pretensions made to do so. The material which is presented is concise and clear-cut. Although dealing with only a small portion of the complicated virus field, the

data have been well digested and to some extent may prove more valuable to workers interested in virology than some of the larger more comprehensive volumes in the same field, which are entirely lacking in critical analyses and offer unselected masses of facts.

Virus Diseases is particularly useful, because the work has been covered by competent specialists in each subject. Working hypotheses have been presented for such fundamental questions as virus immunity and immunization, adaptation of viruses to new hosts, and the course which the infection may take. On several occasions both sides of controversial subjects are discussed.

Virologists and newcomers to the field will find *Virus Diseases* helpful for one reason or another. Although it must be used in conjunction with some of the larger texts in the field it is a necessary and valuable adjunct.

MURRAY SANDERS

War Medicine—A Symposium—Edited by Winfield Scott Pugh, M.D. New York: Philosophical Library, Inc. (15 East 40th St.), 1942. 565 pp. Price, \$7.50.

War Medicine, A Symposium is a collection of outstanding articles on military medicine, orderly arranged and on the whole fairly well illustrated. The articles are grouped under three sections of surgery, aviation and naval medicine, and general medicine. For the most part various articles by English and American authors are quoted entirely or abstracted and the material is concise and factual.

Surgery reviews such subject matter as war wounds and wound healing, burns, anaerobic infections, wounds of the chest, gunshot wounds and their treatment, blast and concussion injuries, shock, blood substitutes and fractures.

Aviation medicine presents certain medical principles peculiar to aviation.

such as hypotension, problems in cardiology, fatigue, compression injuries and the medical aspects of deep sea diving.

General medicine discusses gas casualties, nutrition, allergy, dysentery, certain parasites and certain problems in psychiatry peculiar to military personnel.

Despite the unusual prominence of the contributors to this book the reader gets a series of opinions and recommendations by experts, some of which appear rather extreme to one not experienced in the particular field, and does not get a good descriptive presentation of a single subject followed by specific directions for therapy. Except for this one criticism, *War Medicine* is a book which deserves study by physicians engaged in military medicine and civilian physicians in private practice who expect to enter the service.

L. R. CHANDLER

Publicity—How to Plan, Produce and Place It—By Herbert M. Baus. New York: Harper, 1942. 252 pp. Price, \$3.00.

Until recently publicity was synonymous with ballyhoo, "hot air," and the tricky showmanship of P. T. Barnum. Today, however, publicity has divorced itself from its early connotations and has emerged to fill an increasingly important rôle in world affairs. It is still, of course, put to devious uses. When concocted by thwarted dictators, it can help to plunge nations into war; when fashioned and directed by those with humanitarian instincts, it can play a major rôle in molding a new era of peace and progress. Only through an understanding of this subject can we make sure that publicity fulfils its true purpose: to inform the public truthfully, to stir people to think, to encourage the free exchange of ideas basic in a democracy.

It is fortunate, therefore, to have an

authoritative book on publicity appear at this time. Mr. Baus possesses an encyclopedic knowledge of the subject and its ramifications. In a friendly, entertaining, and informative manner the author discusses all types of publicity—its functions, its technics, its operations, and some of the tricks of the craft. The text is split in three main sections: (1) planning or blueprinting, (2) production or manufacture, (3) placement or distribution. The reader is guided through the "beehive complexity" of the daily newspaper office, the news and photo syndicates, and other publicity producing centers. The policies, the do's and don't's and the idiosyncrasies of the editorial craft are also exposed.

The scope of the book is not limited to printed media, but the radio, the motion picture, letters, exhibits, word-of-mouth publicity (telephone conversations and public speeches), parades and pageants, are also included.

The book does not treat of health publicity as such, although the formulas unfolded in its pages can be adapted to the work of the health educator. Mr. Baus briefly discusses sociological publicity—under which health agency publicity might well be included—and he states that publicity emanating from welfare organizations should have quick entree to all publicity media because of its unselfish and non-commercial nature. The author frankly states that the one drawback preventing greater coverage or acceptance of sociological publicity is its dry and uninteresting nature. Mr. Baus warns against "ballyhooing" publicity of this type and suggests that sincerity be the keynote of public agency releases.

As to the qualifications which a publicist should possess, the author states that there are no cut and dried requirements, no specific professional qualifications. The publicist in any field must be a writer-artist-politician-businessman combined. He must know a little about

everything. Perhaps the prime requisite for a publicist is imagination: he must be able to ferret out newsworthy items in material that others would consider only a pile of dull data.

This book is unreservedly recommended—especially to health educators. The writing is lively, the contents are copious, the point of view is sane. Even if one is wholly uninterested in the mechanics of publicity, this book is entertaining as pure reading matter. It should set the feet of any aspirant with a grain of publicity sense along the right path.

JOHN LENTZ

Terminology and Definitions of Speech Defects—By *Mardel Ogilvie*. New York: Bureau of Publications, Teachers College, 1942. 312 pp. Price, \$3.50.

This is an attempt to clarify the matter of terminology of speech defects, but the volume is so overorganized that it is next to impossible to find anything in it.

LETITIA RAUBICHEK

Minerals in Nutrition—By *Zolton T. Wirschafter, M.D.* New York: Reinhold Publishing Corporation, 1942. 175 pp. Price, \$1.75.

The author discusses the physiological significance of the essential inorganic elements in non-technical language and without consideration of the other essential nutrients. There are inevitable shortcomings in a book which attempts to present the metabolic functions of a single class of nutrients without consideration of the many organic nutrients. The lay reader cannot be accurately informed and gain a comprehension of either physiology or nutrition from this discussion of a single group of elements or compounds.

There are many inaccurate statements. On page 32 it is stated: "Sodium chloride has two vital functions: (1) It helps to maintain the acid-base balance of the body; that is,

it automatically keeps us 'on the alkaline side.' " Carbonate, bicarbonate, and phosphate ions are not mentioned as buffer substances. On page 131 it is stated: "By reducing the manganese content of the diet for rats egg formation fails to occur and reproduction is therefore impossible." On page 118 it is stated: "In cases of goiter, about three times the normal amount of iodine is present in the urine."

The book suffers from an attempt at over-simplification of a complex subject, as well as from careless and inaccurate statements.

E. V. MCCOLLUM

Julius Rosenwald Fund—Review for the Two-Year Period 1940-1942—By *Edwin R. Embree, President of The Fund*. Chicago, Ill., 1942. 39 pp.

This is a stimulating review of the work of The Fund during the past 15 years, in which Negro health occupied a substantial part. This part of the program officially ended in 1942 after the expenditure of a total of \$1,478,000. An excellent condensed report of trends in Negro health is included. The chapter on Color and Democracy shows the underlying significance of the effort to improve medical care, public health, and education for this part of our population.

REGINALD M. ATWATER

When Doctors Are Rationed—By *Dwight Anderson and Margaret Baylous*. New York: Coward-McCann, 1942. 255 pp. Price, \$2.00.

The intent of this volume is excellent, namely, to give the general public an insight into the problem of providing medical care and the procedures established to provide adequate medical service for both the military forces and the civilian population. The book succeeds in doing this, however, only moderately well and with uneven balance.

When it describes the procurement

and assignment of physicians from the purely mechanical standpoint, it does so in simple and informative style. When other more difficult and perhaps more subtle problems of medical care are reviewed, the attempt at popularizing leads to a simplification of statement which becomes almost annoying and which results, too often, in the avoidance of real issues.

The authors of any volume designed to popularize somewhat complicated features of nation-wide controversial issues run the risk of inaccuracy in undue popularization. This is particularly true in the chapter dealing with public health, where the comparisons of accomplishment in this country with that of European countries is unfortunately overenthusiastic in favor of our own. After all, Europe and particularly England and Germany have had a long and sound accomplishment in public health. It is different from ours, but need not be too severely disparaged.

The chapter dealing with "Doctors and Boom Towns" shows some confusion between the necessity for providing physicians for industry and that of providing physicians for the areas surrounding industries. In the first instance, the doctors are needed within industry for industrial hygiene purposes, in the second instance, they are required for the general medical care of the surrounding population in civilian life. The two purposes are largely confused in this chapter, with the latter aspect given little or no discussion.

This confusion would not be nearly so serious if it did not result in avoiding entirely the important problem of civilian medical care in a number of boom areas, such as Mobile, Hampton Roads, Valparaiso, San Diego, etc.

In similar fashion the chapter on "Women Doctors in Wartime" hardly does justice to this problem. The 4½ pages devoted to this subject really

leads nowhere with respect to more effective use of women doctors in or outside of the military services.

Much useful information known to the medical profession, but unfamiliar to the layman, is set forth most of the time with clarity and realism. Perhaps the outstanding deficiency of the volume is that it does not recognize any of the problems in medical care which still confront the general public, namely, of distribution of physicians, of the economics of medical care, and of the pressing controversies as to group practice and hospitalization. The discerning public will probably note and assay these omissions in the volume when it is read.

ABEL WOLMAN

Nutrition and the War — By Geoffrey Bourne, D.Sc. (2nd ed.) Cambridge: University Press. New York: Macmillan, 1942. 148 pp. Price, \$1.50.

This short, concise text is designed solely for the layman, and intended as an aid to the housewife in the selection of alternative foods in the event that the usual foods were unobtainable. In easily understandable language, it considers the energy value of foods, treats of the function of proteins, fats, and carbohydrates, lists the common or well known vitamins, and considers each one separately as to its significance.

Under the chapter headed "Nutrition and War Time," the question of protective and non-protective foods is considered as well as vitamin overdosage, food supplies, food and health, in addition to a short treatise on the German and Russian food situation. The figures quoted for overdosage of vitamins A and D are somewhat out of line, and much more conservative than commonly accepted. Finally, the author in this chapter postulates the problem of the nutrition of the future. The last chapter in the text, consisting of nearly one-half the entire volume,

deals with the nature and composition of various foodstuffs, listing caloric value, protein, fat, carbohydrate, mineral, and vitamin content in terms of very good, good, fair, very poor to negligible.

HENRY T. SCOTT

Group Differences in Urban Fertility—By Clyde V. Kiser. *Baltimore: Williams & Wilkins, 1942. 284 pp. Price, \$2.50.*

Group Differences in Urban Fertility is an analysis of the fertility data obtained in the National Health Survey in 1935-1936. The character and size of the sample population studied make this a reliable source of information, even though the data are not derived from the whole of the United States. Until the detailed 1940 census tabulations are available, Mr. Kiser's study constitutes the most extensive and detailed source of information on recent fertility differentials.

The basic data are in the form of annual birth rates and so are not directly comparable with some earlier studies dealing with the total number of children ever born. Certain conclusions concerning trends in the differentials can be drawn from the material however. In general, the familiar pattern of high birth rates in families of low socio-economic status and increasingly lower birth rates as socio-economic status improved, is repeated in the National Health Survey data. All differentials, however, appeared to be narrowing perceptibly, and in some instances there was a definite reversal of the pattern.

One of the most valuable chapters in the book deals with the cross-classification of the attributes considered. For example, the birthrates of native white wives, classified according to occupational status of the husband, were analyzed for the effects of income and education within each occupational group. This analysis demonstrates

clearly the biases in each single type of classification. The chapter on pregnancy wastage, though based on fragmentary data, should be of special interest to public health workers.

The book will be valuable as a reference text embodying detailed analysis of the most recent broad population data for selected cities of the United States.

REGINE K. STIX

Proceedings of Sixty-Ninth National Conference of Social Work, New Orleans, May, 1942—*New York: Columbia University Press, 1942. 670 pp. Price, \$5.00.*

Wartime problems held the center of the stage at the 1942 National Conference of Social Work.

Reviewing the Conference proceedings, recently off the press, we see this unifying theme tying together much more effectively than usual, this great conference, so likely to resemble a six ring circus in its wide range of interests and activities.

Malcolm MacDonald, High Commissioner from the United Kingdom of Canada, perhaps came as near sounding the keynote of the conference as any of the notables on the program. Said MacDonald, "One of the best ways of preserving the morale of the civilian population is by keeping at full blast all those social services which can contribute to a fitness of body and a calmness of mind under a terrific ordeal."

An excellent group of papers is found in this volume: President Shelby Harrison's Social Work on Three Fronts; Vera Micheles Dean on After Victory; a series of thoughtful discussions of the upsurging Negro problem in the South; others on the impact of war on social work needs and on children; developments in the fields of health, employment, and Social Security. Together they constitute a volume that is timely as well as a valuable permanent record.

BLEECKER MARQUETTE

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

War's Toll—Though the death rate in this representative sample was lower for 1942 than for 1941, most of the improvement occurred in the childhood age groups and over age 55. Among white males ages 20 to 24 the excess was almost 34 per cent. Nearly half these deaths were in the military personnel. This is a solemn reminder of what we may expect of the current year.

ANON. Mortality Record for 1942. Stat. Bull. (Met. Life Ins. Co.), 24, 1:1 (Jan.), 1943.

First Aider—Stop, Look, Listen!—External heat to treat shock is a time-honored method. Anyone who has read even the most elementary first aid manual knows enough to run for blankets and not-too-hot water bottles. Cautiously, it is proposed that heat be *not* applied in shock when only the skin is cold but rectal temperature is normal or above. The chief reason for including a reference to the subject still in the research stage in this column for practising health officials is to remind us that humility is above price, and that even in matters of first aid the last word is yet to be said.

ANON. Cooling in Shock (An Editorial). J.A.M.A. 121, 6:432 (Feb. 6), 1943.

Brucella suis—Here is still another for the record: an epidemic of brucellosis numbered 77 victims among the users of an unpasteurized milk supply. Raw milk addicts may be reminded that the average duration of fever was 6 to 8 weeks, and that undulant fever is no fun.

BORTS, J. H., *et al.* A Milk-Borne Epidemic of Brucellosis. J.A.M.A. 121, 5:319 (Jan. 30), 1943.

What the Division of Industrial Hygiene Does—Old men, women, the handicapped, and veritable youngsters are being taken into industry. And these people who lack physical adaptability and experienced work-habits of the men who have gone into service, are laboring harder and for longer hours than heretofore. That is a challenging introduction to the present-day industrial hygiene program if ever there was one.

DRAPER, W. F. Government's Obligation in Industrial Health. New Eng. J. Med. 228, 6:178 (Feb. 11), 1943.

Department of Intimate Confidences—Knowing next to nothing about psychology it's not for the likes of me to pass judgment, but this paper on current edition parent-child relationships strikes me as so eminently sound that it is commended heartily to you—parent, if you are one. When I reached "never is a parent to strike his child *except* in anger" then I just knew this item must appear. P.S. There are many solid looking papers in the same issue that I didn't read, but you should.

GILDEA, M. C.-L. The Modern American Parent. Ment. Hyg. 27, 1:43 (Jan.), 1943.

Health Educators Will Agree—First objective in a national health program is to intensify public health education: this is truer today than ever before. Next in order of importance is nutrition to which is linked child health. The "also ran" activities constitute a long list in this Canadian Health Officer's outline of present-day health administrative problems.

GROULX, A. A National Health Program. *Canad. J. Pub. Health* 34, 1:10 (Jan.), 1943.

Despite Theoretical Objections—Under as nearly identical conditions as could be obtained in industrial practice, one group of workers was given a vitamin-mineral concentrate, a similar group served as a check. The treated group not only had a greater average production than the controls, but more significant, after the second week, there was a steady increase in rate of production among the treated employees. The discussion of the limitations of research of this character should be read by all would-be researchers.

HAGGARD, H. W. Supplementary Feeding in Industry. *J. Indust. Hyg. & Toxicol.* 24, 10: 332 (Dec.), 1942.

Arthropod-borne Virus Encephalitis—Eastern and western equine, and St. Louis type encephalitis should be classified as a group. The place names bear no relation to the limits of these infections. The rôle of mosquitoes as vectors seems to be established. Mosquito bite protection, larva control, and vaccines all may play a part in prevention.

HAMMON, W. McD. Encephalitis. *J.A.M.A.* 121, 8:560 (Feb. 20), 1943.

Blissless Ignorance —Food for health educator's thought: among a group of cancer patients only 26 per cent had read anything really educative about cancer (and that mostly in the newspapers), only 1.2 per cent had seen a cancer pamphlet and heard a lecture on cancer. They waited on the average $3\frac{3}{4}$ months after the beginning signs before seeking medical help. Conclude the authors: "this educational program is still inadequate and ineffective."

HARMS, C. R., *et al.* Delay in the Treatment of Cancer. *J.A.M.A.* 121, 5:335 (Jan. 30), 1943.

Sanitary (?) Bubblers —A high proportion of drinking fountains now in use would be condemned by any criterion of sanitary decency, and certain types are potentially more dangerous than the old chained tin cup. There's a challenging statement for you, so read all of this brief report.

HITCHENS, A. P., and ROSS, O. A. Bubbling Drinking Fountains. *J. Am. Water Works Assn.* 35, 2:165 (Feb.), 1943.

Epidemiologic Study of Venereal Disease Sources—Evidence to prove what all health workers know to be the case: when prostitution is "regulated" venereal infection rates rise. When it is repressed, they fall. This is an instructive case history of two cities near an army camp.

JOHNSON, B., JR. When Brothels Close, V. D. Rates Go Down. *J. Soc. Hyg.* 28, 9: 525 (Dec.), 1942.

How Our Half Lives—It's about time someone looked into the dietary habits of the favored few. This study of the meals of a considerable group of persons from the upper income level reveals that their diets are markedly deficient in thiamin and riboflavin, only fats were furnished in excess of needs. Milk, eggs, fruit, and whole grain (or enriched) products were frequently found lacking, as they are "on the other side of the tracks." Among the 9 physicians in the group the diets were as bad as the others.

KELLY, H. T., and SHEPPARD, M. A Dietary Study of Subjects from Upper Income Groups. *New Eng. J. Med.* 228, 4:118 (Jan. 28), 1943.

Rural Obstetrics—In that favored region, the first rural area to have a home delivery nursing service, the nurse saw the mother only after the birth certificate was issued in more than half of all cases. This is only one finding of a useful questionnaire study of obstetric care.

O'BRIEN, H. R. Factors in Obstetric Care. New York State J. Med. 43, 3:236 (Feb. 1), 1943.

U. S. P. H. S. vs. Wartime T. B.—Chest x-rays of war workers with the service extended to families of those found positive; follow-up of rejected recruits; reorganization of local programs to meet wartime needs—these are some of the promising objectives of the Office of Tuberculosis Control.

PARRAN, T. Tuberculosis Control Program

of the U. S. Public Health Service. J.A.M.A. 121, 7:520 (Feb.), 1943.

Commonest Pneumonia Types—

In a two year nation-wide sampling, three quarters of all pneumococcic pneumonias were found to be due to ten types of pneumococci. This suggests a revision and simplification of current pneumonia typing procedures.

RUMREICH, A. S., *et al.* A Nation-wide Study of the Bacterial Etiology of the Pneumonias. Pub. Health Rep. 58, 4:121 (Jan. 22), 1943.

BOOKS RECEIVED

MAN IN STRUCTURE AND FUNCTION. By Fritz Kahn. New York: Knopf, 1943. 2 volumes boxed. Prepublication price \$8.75. April 5, \$10.00.

PLUMBING PRACTICE AND DESIGN. By Svend Plum. Vol. I. New York: Wiley, 1943. 308 pp. Price, \$4.50.

SOCIAL WORK YEAR BOOK 1943. By Russell H. Kurtz, Editor. 7th issue. New York: Russell Sage, 1943. 763 pp. Price, \$3.25.

FOOD POISONING. By G. M. Dack. Chicago: University of Chicago Press, 1943. 138 pp. Price, \$2.00.

EAT WELL FOR LESS MONEY. By Gaynor Maddox. New York: Dutton, 1942. 219 pp. Price, \$2.00.

INTENSIVE RURAL HYGIENE WORK IN THE NETHERLANDS EAST INDIES. By J. L. Hydrick. New York: Netherlands Information Bureau, 1942. 83 pp.

ORTHOPEDIC CONDITIONS AT BIRTH. Nursing Responsibilities. Jessie L. Stevenson. New York. Published and Distributed by the Joint Orthopedic Nursing Advisory Service

of the National Organization for Public Health Nursing and the National League of Nursing Education.

PUBLIC HEALTH IN BRIDGEPORT. Report of a Public Health Survey by the Department of Health, Yale University School of Medicine. 1943. 91 pp.

HEALTH OF NORTH DAKOTA'S 650,000. Twenty-Seventh Biennial Report, July 1, 1940 to June 30, 1942. 210 pp.

CITY HOUSING CODE. Baltimore City Health Department. 1943. 21 pp.

CANCER: A CHALLENGE TO YOUTH. Study Outline. Mineola: Nassau County Cancer Committee. 16 pp. Paper.

INDUSTRIAL RELATIONS DIGESTS. XIII. Nutritional Programs for Industrial Employees.

XIV. The Medical Department in War Industries. Industrial Relations Section, Department of Economics and Social Institutions, Princeton University, Princeton, N. J., 1942.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND SEVENTY-SECOND ANNUAL BUSINESS MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

- P. J. Paul L'Heureux, M.D., D.P.H., 319 Dumoulin St., St. Boniface, Manitoba, Can., Medical Director, City of St. Boniface
Jack Masur, M.D., Dupont Circle Apts., Washington, D. C., Medical Division, Office of Civilian Defense, P. A. Surgeon, U. S. Public Health Service (R)
Frank L. McGahey, M.D., Health Dept., Grenada, Miss., Director, Grenada County Health Dept.
Milton B. Sherrard, M.D., North Central District Health Unit, Lewiston, Ida., Acting Director
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R. Murray Wingard, M.D., Wilkinson County Health Dept., Woodville, Miss., Director
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- Albert E. Edel, Ph.D., 10 Hill St., Newark, N. J., County Toxicologist, Chief Medical Examiners Office, Essex County
Max Feldman, Ph.M., U. S. Naval Air Station, Georgetown, British Guiana, Laboratory Technician
Wayne A. Geib, M.D., Fitzsimons General Hospital, S. M. D. T., Denver, Colo., Instructor, Laboratory Section
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- Arthur J. Harvey, 237 Granite St., Cadillac, Mich., Sanitarian, Wexford County Health Unit
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- Mary S. Feth, State Health Dept. 711, Santa Fe, N. M., State Nutrition Consultant, State Dept. of Public Health
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- Herbert Ratner, M.D., 1018 N. Harlem, River Forest, Ill., Director of Student Health, Loyola Univ.
- Edward R. Reinig, M.A., 3735 Fourth, Detroit, Mich., Health Educator, State Dept. of Health
- Simon Shapiro, D.D.S., 142 Joralemon St., Brooklyn, N. Y., Member, Advisory Committee, Committee on Neighborhood Health Development
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Public Health Nursing Section

- Marion C. Bakken, 521 Idaho St., Boise, Ida., Orthopedic Field Nurse, State Dept. of Health
- Marie Chard, 502 S. Eye St., 7, Tacoma, Wash., Advisory Public Health Nurse in Maternal and Child Health, Washington State Dept. of Health
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- Toledo, Ohio, Coördinating Director of Nurses, Toledo Dept. of Health
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- Eardie C. Kauffman, 422 N. Main St., Pleasantville, N. J., Supervising Nurse, American Red Cross, Atlantic County
- Elizabeth J. Mackenzie, 300 West York St., Norfolk, Va., Director Public Health Nursing Service, City Union of The King's Daughters
- Katherine MacKenzie, R.N., 132 Main St., E., North Bay, Ont., Can., Public Health Nurse, Dept. of Public Health, North Bay, Ont., Can.
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- Mamie A. Seibert, R.N., Davis-Fairfax Community Nursing Assn., Davis, W. Va., Community Nurse
- Helen M. Smith, R.N., P. O. Box 505, Perth, Ontario, Can., Public Health Nurse, Ontario Dept. of Health
- Alma M. Talley, R.N., 4518 West Seminary, Richmond, Va., Supervisor, Instructive Visiting Nurses Assn.
- Lola H. Torbert, 17 S. Downing, Denver, Colo., Nurse, Denver Tuberculosis Society
- Romayne Wicks, R.N., 1014 Evergreen Ave., Goldsboro, N. C., Public Health Nurse, Venereal Disease Control, Wayne County Health Dept.

Epidemiology Section

- William B. Baily, M.D., 227 Kirk St., Morgantown, W. Va., Health Officer, Monongalia County Health Dept., U. S. Public Health Service, P. A. Surgeon (R)
- Joseph C. Bender, Ph.M., 9 De Forest Ave., Summit, N. J., Dept. of Epidemiology, Naval Medical Center, Bethesda, Md.
- Joyce E. Blunt, Division of Vital Statistics,

- Parliament Bldg., Victoria, B. C., Can., Statistician, Provincial Board of Health
- Lieut. Stephen A. Ginn, M.C., Epidemiological Unit, Naval Operating Base., Norfolk, Va., Medical Officer, U. S. Navy

Unaffiliated

- A. H. Christiansen, Veterans Administration, Boise, Ida., President, Idaho Public Health Assn.
- Morton C. Creditor, Biology Dept., Purdue Univ., Lafayette, Ind., Graduate Asst. in Bacteriology
- David M. Dorin, Beth Israel Hospital, Stuyvesant Park, East, New York, N. Y., Asst. Director
- Major Harold B. Hilton, M.A.C., Headquarters First Air Force, Mitchell Field, N. Y., Administrative Asst. to Surgeon
- Gloria A. Kay, 14 Clinton St., Cambridge, Mass., Research Assistant at Thorndike Memorial Laboratories
- Albert G. Milbank, LL.B., 15 Broad St., New York, N. Y., President of Milbank Memorial Fund
- Frederick A. O. Schwarz, LL.B., 15 Broad St., New York, N. Y.
- Hilda A. Weidner, R. N., 122 N. 18th St., Warwood, Wheeling, W. Va., Charge of First Aid, Wheeling Steel Corp.

DECEASED MEMBERS

- Richard P. Borden, Fall River, Mass., Elected Member 1920, Unaffiliated
- Clarence N. Boynton, Phoenix, Ariz., Elected Member 1916, Elected Fellow 1935, Laboratory Section
- Thomas E. Camper, M.D., Corunna, Mich., Elected Member 1936, Health Officers Section
- Marvin F. Haygood, M.D., West Point, Ga., Elected Member 1918, Elected Fellow 1938, Health Officers Section
- Theodore F. Pappe, Buffalo, N. Y., Elected Member 1940, Food and Nutrition Section
- J. F. X. Stack, M.D., Hoboken, N. J., Elected Member 1923, Health Officers Section
- Frank A. Williams, M.D., Lake Providence, La., Elected Member 1936, Health Officers Section

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

U. S. CIVIL SERVICE COMMISSION. Public Health Nursing Consultants, 5 grades. Write U. S. Public Health Service, Washington, D. C.

Physician, man or woman, as director of Division of Maternal, Child and School Hygiene in southern city department of health. Woman physician with pediatric training preferred, public health experience not essential. To operate prenatal, infant and preschool clinics and promote school health program. Salary commensurate with ability and qualifications of applicant. Apply Box J, Employment Service, A.P.H.A.

Southern state department of health seeks several obstetric and pediatric consultants, requiring a minimum of a year's residency in a specialty, immunity to draft and preferably training in public health. Men and women are eligible. Salary \$300 per month plus travel. Apply Box C, Employment Service, A.P.H.A.

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

Public Health nurses wanted for two-county unit in Michigan. Must be graduates with a minimum of 4 months' public health training or 8 months' training under supervision. Salary \$1,800 per year

with travel allowance \$35 to \$41 per month. Must drive and own a car. Address Dr. Koupal, Director, Alger-Schoolcraft Health Dept., Manistiquet, Mich.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Wanted: School Dental Supervisor to administer and operate dental program in City schools and clinics in City 50,000 population. Salary \$3,000 to \$3,600 with travel allowance. Those interested should address Dr. W. A. Browne, City Health Department, Alexandria, Va.

Wanted: Chemist and Bacteriologist experienced in the food field for position

as director of laboratory operated by national association. Preference given to man familiar with soft drink industry and capable of addressing meetings and writing for publication. Apply in writing giving brief history, references, salary, and draft status. Address American Bottlers of Carbonated Beverages, 1128 Sixteenth St., N.W., Washington, D. C.

The Milwaukee City Service Commission announces an examination for assistant chief in charge of sanitary inspection. Salary first year \$210 per month increasing by \$10 increments annually until a maximum of \$260 per month is reached. Applicants must be citizens of the United States, between 25 and 45 years of age. Those interested may communicate with the Milwaukee City Service Commission, Room 716, City Hall, Milwaukee, Wis.

Sanitarian wanted in county of 28,000 in Midwest. Salary \$1,800 plus \$500 travel. Must own car. Complete supervision and execution of sanitation program, including milk, water, food-handling, etc., and general sanitation of

environment in county. Address Box I, Employment Service, A.P.H.A.

Merit System for Personnel Administration, Delaware, is accepting applications for position of Deputy State Health Officer in Delaware State Board of Health. Salary range \$3,600 to \$4,200. Applications accepted until further notice. Those interested should communicate with Merit System Supervisor, P. O. Box 1911, Wilmington Delaware, or State Board of Health, Dover, Del.

The Board of Health, Territory of Hawaii, announces applications will be received for positions as Medical Technician in their public health laboratories. The positions: Civil Service Classifications, SP-5, salary range \$154.17 to \$192.92 per month; SP-6, \$172.50 to \$217.50 per month, subject to retirement deductions under Hawaiian Civil Service System, plus graded bonus for the period of time such bonus remains in effect for Territorial Government employees.

Interested persons may make written application to Board of Health, Territory of Hawaii, P. O. Box 3378, Honolulu, T. H.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

M.D., Dr.P.H., interested mental and industrial hygiene, chief of mental hygiene clinic, on staff of psychiatric hospital, speaker, writer, author of books on health, diplomate in psychiatry, professor of psychiatry. Ineligible for military service because of age, healthy, vigorous, able to work hard, now in private practice; would make sacrifice and accept decent but lower remuneration than present income if he could be employed in war industry, preferably New York, New Jersey, or Connecticut. United States citizen. Had important government job in last war. Speaks and writes several languages. A-504.

Milk sanitarian open for position July

1, 1943. Fifteen years' experience administering and enforcing milk sanitation laws and regulations in midwestern state. References. M-500.

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and bacteriologist and serologist in syphilis and enteric diseases. L-465.

Physician, age 36, M.D. Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. A-476.

NEWS FROM THE FIELD

THE NATIONAL RESOURCES PLANNING BOARD REPORTS

On March 10, President Roosevelt sent to Congress two reports of the National Resources Planning Board. Long anticipated, they had been referred to variously as "blueprints for the future of democracy," "the American Beveridge plan," and "schemes for the complete socialization of the United States." One document, titled "National Resources Development—Report for 1943," dealt with the Board's work on post-war plans and presented a record of wartime planning activities. Temporary measures for the transition period between the cessation of hostilities and the restoration of a peacetime economy are recommended. Guarantees of jobs for everyone able to work and decent living conditions for everyone are part of the long-range planning for peacetime.

The second report on "Security, Work and Relief Policies" was described by the President in his message of transmission to Congress as having been developed over the last three years by the Board in coöperation with the federal agencies concerned and with the help of citizens with special knowledge and competence in this field. "It reviews," he said, "the accomplishments and experience of the last ten years, pointing out some of the weaknesses of our security system, and suggesting ways and means of improving and strengthening the whole program." He expressed the hope that Congress would give full consideration to these matters during this session.

This report contains specific recommendations based on a comprehensive review of the various public measures taken during the last ten years to pro-

vide greater security to the American people. In its introduction, the Board states: "Four main points seem to need emphasis:

"Our economy must provide work for all who are able and willing to work. Included in this is a special responsibility for an adequate youth program which should be an integral part of any Governmental undertaking to establish security. This will be peculiarly true in the postwar period.

"For great numbers whose work is interrupted, the social insurances must carry much of the load of providing adequate income.

"Where the insurance or work policies fail to take care of an interruption in income, adequate guarantees of minimum aid and assistance must be given both to individuals and families through a general public assistance system.

"Where adequate services essential to the health, education, and welfare of the population are not available, public provision should be made for the development of such services.

"But no one of this series of proposals should be expected to solve the problem of insecurity. Taken together, they constitute a rounded and integrated program. Any one of them standing alone can be criticised as inadequate, and properly so. Unfortunately, complete and well rounded programs seldom are able to be adopted at one time. Living is so complicated and our system so intricate that to change it except step by step may create stresses more serious than the evils the program is designed to correct. The program suggested here is not of that kind. It is all within the realm of practical realization."

Governmental responsibility toward many aspects of living is recognized and clearly stated. A policy of public aid is recommended, based upon acceptance of the facts that the need for public aid will be long and persistent; that maladjustments in the national economy and personal physical or psychological

defects, many of which are remediable, cause the need for public aid, and that social problems created by economic insecurity require a series of diversified programs for their solution.

The specific recommendations for extending the social security program include:

Development of a system of social insurance against temporary and permanent disability.

Expansion of the unemployment compensation system to embrace employees of non-profit corporations, agricultural and domestic workers, and employees of small firms.

Increase of the benefits period to 26 weeks.

Reconsideration of benefit formulas so that recipients can maintain themselves without recourse to other forms of public aid. Payment of dependents' allowances "might be a first step in this direction."

Abolish experience rating as a part of the unemployment compensation program.

Replace the present federal-state system with a wholly federal system.

Extend old age and survivors insurance to cover employees of nonprofit corporations, agricultural and domestic workers.

Revise financial arrangements to provide that part of the costs of old age and survivors insurance is drawn from the general tax revenues.

Increase benefits payable to the low-income groups under old age and survivors insurance.

Federal grants-in-aid for general public assistance, in addition to adequate work and social-insurance programs, available on a basis reflecting differences in need and economic and fiscal capacity as between the states.

Access to health education and welfare services for everyone, requiring marked expansion of present services, especially in low-income areas, the responsibility for their development to be shared by local, state, and federal authorities.

Administration of public social services by qualified full-time personnel selected on the basis of merit.

More adequate medical care. The federal government "should stimulate, assist or undertake constructive action to provide such care for the millions whose need cannot be fully met from their own resources."

Adequate provisions for promoting the health of mothers and children.

Expansion through federal aid of state and local child welfare services for the prevention

of neglect and delinquency so that these services will be "everywhere available."

Provision of free school lunches for all school children.

Extension of the stamp plan for the distribution of surplus commodities to the entire low-income population.

The report is definite with regard to the administration of public aid programs. A single agency should administer all public assistance programs operating in one locality. There should be a central information office in every community to inform applicants for aid of public and private community resources and to direct them to the agency best suited to their needs. The merit system, it states, "should be extended upward, downward and outward for all personnel in the field of public aid." Restrictions on residence in a state or a locality as a condition of employment should be removed. Access to all programs offering employment or training should be through public employment offices.

The Federal Security Agency should be given the status of an executive department and the administrator should be given the status of a member of the Cabinet. The agency should be vested with primary and continuing responsibility for promoting and safeguarding the general welfare, health, and education of the people. The establishment of a permanent national advisory body is recommended to study the over-all operation of public aid policies and programs and advise the President, the Congress, and the country. Similar advisory bodies, representing public and private agencies and the public, should be established at the state level. Public agencies should seek to close the gap between administrators and the public by a continued program of public information, by citizen participation in policy-making, and by "more effective use of the coöperation of private welfare agencies which have a necessary

part to play in this enlarged conception of public welfare service."

Recommendations concerning comprehensive federal work programs are included, as well as programs for youth and for the handicapped. "All youth programs," it is stated, "should devote special attention to the physical health of youth, and financial provision should be made accordingly."

No estimates as to costs of the over-all program and its several parts are attempted in the Board's report, although it suggests that the full cost of the public-assistance program should be borne by the general tax payer and the costs of the social insurance program by the workers, employers, and the general tax payers. The Board warns that because it aimed at developing a well coördinated and consistent body of policies and principles, "no one of its specific recommendations can be considered apart from the whole system of which it is an integral part."

WAR CONFERENCE

The medical, surgical, and industrial hygiene experts who are so ably safeguarding the well-being of more than 20 million industrial workers have agreed to pool their knowledge and exchange their experiences regarding the many new and complex problems of today's wartime production. For this purpose their organizations—the American Association of Industrial Physicians and Surgeons, the American Industrial Hygiene Association, and the National Conference of Governmental Hygienists—are combining their annual meetings in a four day "War Conference" at Rochester, N. Y., May 24–27, 1943.

This joint meeting will be a report on the state of the nation, by the men who know, in matters of industrial health. Dr. William A. Sawyer, Medical Director of Eastman Kodak, is General Chairman; Dr. James H. Sterner and Lieut. Comm. J. J. Bloom-

The Chairman of the National Resources Planning Board is Frederic A. Delano.

The report under discussion was prepared by a special committee of the Board under the Chairmanship of William Haber, Professor of Economics, University of Michigan. The agencies, federal and otherwise, represented on the special committee are the Farm Security Administration, Community Chest of Cincinnati, Federal Work Projects, The Catholic University of America, the American Public Welfare Association, the Children's Bureau, and the Federal Security Agency. Eveline M. Burns, Ph.D., was director of research for the study, assisted by Franz Huber, Herman M. Somer, Glen B. McClelland, and a group of economists and research assistants on the staff of the National Resources Planning Board and the various federal agencies concerned with work, security, and relief policies.

field are arranging the programs for the industrial hygienists.

ACTIVITIES OF THE DERMATOSES INVESTIGATION SECTION, U. S. PUBLIC HEALTH SERVICE

The Dermatoses Investigation Section of the National Institute of Health, known as DI, was organized in 1928, under the direction of Louis Schwartz, M.D., medical director, U. S. Public Health Service. The section is concerned with skin disease outbreaks in industry.

Typical of how the DI section operates is the case which arose when an unusual outbreak of skin rash occurred in an eastern war plant. Observers at the plant reported to the DI section's headquarters at the National Institute of Health in Bethesda, Md., that workers making explosives and those filling shell casings were developing a rash on hands, arms, and faces.

DI dermatologists went to the plant and, after a short investigation, found that fumes, generated in the manufacture of TNT, and contact with the powder itself were causing the trouble. With the cause of the outbreaks determined, DI investigators next outlined preventive measures. Detachable sleeves and gloves, that fitted together neatly at the wrists and both made of pliofilm, were developed in the Bethesda laboratory. The flexibility and appearance of this material and its impermeability to the dust, powder, and fumes that were affecting the workers made it the perfect answer.

Safety appliance manufacturers had devised gas masks and work helmets to protect face and head. These sometimes proved awkward and uncomfortable, the doctors reported, and workers discarded them after a few days. Continuing their experiments, the DI researchers produced a pleasant-smelling ointment, for the workers to smear on face and neck, which gave them adequate protection.

An example of the importance of this technical "know-how" is the way DI doctors solved an outbreak of skin trouble among workers in a midwest ordnance plant. The plant reported that men were complaining of skin eruptions on their hands. Plant doctors were puzzled. A DI doctor went to the plant, investigated the manufacturing processes thoroughly, tested all the materials that went into production, all the by-products, all the oils used on machinery and equipment, but he found no clue. Then he examined the workers' clothes and tried to discover some finishing material in their clothing or gloves that might cause the irritation. This line of investigation disclosed nothing. The government dermatologist finally unearthed the fact that the affected workers used a harsh work soap that contained solvents like gasoline and kerosene to remove grease and oil

quickly from the skin. Following the DI doctor's advice, the workers stopped using the harsh cleanser and substituted milder ones suggested by the DI doctors. The rashes cleared up in a short time.

Recently a threatened strike in a Seattle shipyard was averted by prompt action on the part of Public Health Service dermatologists. Electricians in one of the city's four shipyards developed a skin eruption which caused considerable alarm. The workers threatened to strike when they learned they were working with cable made by a copper company where occupational hazards resulting in some deaths had recently been reported. Plant officials persuaded the workers to stay on the job until an investigation could be made. Dr. Schwartz flew to Seattle, examined the workers suffering from the "cable rash," and proved immediately that the cause was the chlorinated compound in which the cable was packed. He recommended that the company use a hood respirator to protect the electricians' faces from the chlorine fumes; that the plant should provide clean overalls every day, and that the workers wear long underwear which they should change daily. These precautionary measures were put into practice at once. The strike was avoided and the workers were protected.

ORGANIZATION OF NATIONAL HEALTH ADVISORY COUNCIL

The Chamber of Commerce of the United States in Washington, D. C., recently announced the formation of a National Health Advisory Council "to project and carry out a broad program looking to health conservation as one of the most important factors in winning the war."

The Council has been organized with James S. McLester, M.D., Professor of Medicine at the University of Alabama, as general chairman. He announced

that the National Health Advisory Council will serve to channel approved technical health information developed by the country's many scientific associations to business organizations and their members throughout the country so that there may be brought about a better public understanding and appreciation of medical science as a means of safeguarding public health to win the war. It will work through the Chamber of Commerce of the United States as a central organization which in turn will use its membership of trade associations, chambers of commerce, and other firms. The Council at the outset is organized with 30 national leaders in medical and health work. It is expected that the membership will be increased.

The Council's first meeting was held in Washington and was presided over by James L. Madden of New York, Vice-President of the Metropolitan Life Insurance Company and Chairman of the National Chamber of Commerce Insurance Department. Participants in the discussion beside Dr. McLester included Wilson G. Smillie, M.D., Cornell University Medical College, New York; Felix J. Underwood, M.D., State Health Officer, Jackson, Miss.; Leverett D. Bristol, M.D., Health Director, American Telephone and Telegraph Company, New York; and H. M. Marvin, M.D., Yale University, New Haven.

Three committees of the Council have been organized under the general chairman which include the following persons:

Community Committee, Chairman Wilson G. Smillie, M.D., New York—Paul White, M.D., J. Burns Amberson, M.D., George Kosmak, M.D., George R. Cowgill, Ph.D., Harry Bakwin, M.D., Ernest L. Stebbins, M.D., F. J. Underwood, M.D., Bailey Burritt, Henry F. Vaughan, Dr.P.H.

Industrial Committee, Chairman Leverett D. Bristol, M.D., New York—Harvey Bartle, M.D., Philip Drinker, Ph.D., Anthony J. Lanza, M.D., John J. Prendergast, M.D.,

Loyal A. Shoudy, M.D., W. A. Sawyer, M.D., Harry E. Ungerleider, M.D., John J. Wittmer, M.D., John Dewey Dorsett, and G. W. Hardy.

Committee on Individual Health, Chairman James E. Paullin, M.D., Atlanta, Ga.—Leroy U. Gardner, M.D., George Morris Piersol, M.D., Russell Wilder, M.D., Alfred Blalock, M.D., Joseph C. Doane, M.D., Marion G. Howell, R.N., Arthur F. Chace, M.D., H. M. Marvin, M.D., Louis Hamman, M.D., Wallace C. Yater, M.D.

PUERTO RICO PUBLIC HEALTH ASSOCIATION

The second annual meeting of the Puerto Rico Public Health Association was held in San Juan at the School of Tropical Medicine and Public Health, January 30–31. The well attended meeting was under the Presidency of Major E. Garrido Morales, M.C., U.S.A., and the following officers were elected:

President—Pablo Morales Otero, M.D.

President-Elect—O. Costra Mandry, M.D.

Vice-President—E. Martinez Rivera, M.D.

Secretary—G. Arbona, M.D.

Treasurer—Celia Guzman

Representative to the Governing Council—A. Fernos Isern, M.D.

Board of Directors: E. Quintero, M.D., Joseph Dean, M.D., Mary P. de Rahn, Isolina Rivera, R. Fernandez Marchante, M.D.

NEW GRANTS BY THE NUTRITION FOUNDATION, INC.

George A. Sloan, President of the Nutrition Foundation, New York, announced on March 13 that grants totaling \$148,550 for nutrition research during the coming year had been made by the Nutrition Foundation in accordance with recommendations of the Scientific Advisory Committee. Twenty-eight projects supported by the Foundation during 1942 were renewed, with grants totaling \$110,700, and fifteen new research projects for a total grant of \$37,850 were made. The total in research grants to forty universities since the first grants made one year ago is now \$316,000.

Charles Glen King, Ph.D., Scientific Director of the Foundation, described work that is being done under the auspices of the Foundation on amino acids, on the supply of suitable fats to the armed forces in all sections of the world, on nutrition problems relating to aviation and desert warfare, and on the effect of extremes of environment upon nutritional requirements. Dr. King stated that there is close coöperation with the officials in the Quartermaster Corps, the Surgeon General's Office, and the Department of Agriculture.

Institutions which received new grants included the University of Wisconsin, Harvard University, University of Toronto, Columbia University, University of California, Johns Hopkins University, New York University, Massachusetts State College, the University of Chicago, Yale University, Cornell University, Oregon State College and Oklahoma Experiment Station.

V. P. Sydenstricker, M.D., of the University of Georgia Medical School, was appointed a member of the Scientific Advisory Committee of the Foundation. O. C. Carmichael, Chancellor of Vanderbilt University, Nashville, Tenn., and F. G. Boudreau, M.D., of the Milbank Memorial Fund, New York, and Chairman of the Food and Nutrition Board of the National Research Council, were elected public members of the Foundation.

NEW YORK STATE ADOPTS REGULATIONS FOR HUMAN BLOOD BANKS

The Public Health Council of New York State in February adopted a new chapter of the State Sanitary Code, Chapter IV-A, which is believed to be the first regulatory action taken by a state body in the field covering human blood donors, human whole blood, human plasma, human serum or other human blood derivatives used for transfusion purposes.

The requirements prescribed are designed to meet the need for basic standards to insure the safety of human blood products. Possible dangers from the use of improperly prepared or stored human blood products for transfusion purposes were first discussed by the Council in 1941. As processing practices became more stable and it appeared that the establishment of blood plasma banks would become widespread and might include many small institutions lacking adequate equipment and qualified personnel, regulatory action was deemed desirable. The amendment has been designed to care not only for changes affecting the technical aspects of preparation of blood, but also certain over-all factors as a determination to distinguish between the requirements for commercial laboratories and other laboratories or hospitals and to regulate by requiring careful recording of basic information instead of listing certain specific requirements as to how the blood should be collected, processed, stored, and used. The purpose of the latter decision is to promote progress in the development of blood processing while fixing responsibility for the procedure on the part of the laboratory or institution.

INSTITUTE ON PUBLIC HEALTH ECONOMICS, UNIVERSITY OF MICHIGAN

A two weeks' Institute for training in the organization and management of prepayment plans of various types will open May 10, 1943, at the School of Public Health, Ann Arbor, Mich. The school is able to offer this course through a grant from the Rockefeller Foundation, made through the Committee on Research in Medical Economics, and with the aid of an Advisory Committee representing hospital, medical, coöperative, rural, and other types of health service plans. Students may

live on the campus at moderate rates. The university charges a registration fee of \$5.

The Institute is designed to meet the needs of two groups of students: (1) those already working with a prepayment plan or having a specialized interest in this field of administration; (2) those who are concerned with public health, hospital administration, or other community services and who feel it wise to learn about the growing field of health service plans. In the program of instruction, much stress will be laid on discussion. The subjects covered will include (a) the basic facts of the economic and social aspects of health services as they involve population, professions, and institutions; (b) plans of organized care of various types, their development, problems, and current issues; (c) special topics relating to the organization and administration of health service plans, *e.g.*, an intensive series on methods of appraising community medical facilities and needs, especially designed for public health people, and several technical series on management problems, statistics, and accounting connected with prepayment plans.

The instructing staff will include several members of the university faculty, all the members of the Advisory Committee, and a number of other persons concerned with the organization and management of prepayment plans and with related problems of industry, labor, governmental, and professional bodies.

The Advisory Committee includes:

Michael M. Davis, Ph.D., Chairman, Committee on Research in Medical Economics, New York

Dean A. Clark, M.D., U. S. Public Health Service, Washington

Franz Goldmann, M.D., School of Public Health, Yale University, New Haven

A. E. Larsen, M.D., California Physicians' Service, San Francisco

John R. Mannix, Michigan Hospital Service, Detroit

James C. McCann, M.D., Massachusetts Medical Service, Boston

Fred R. Mott, M.D., Farm Security Administration, Washington

Kingsley Roberts, M.D., Medical Administration Service, New York

C. Rufus Rorem, Ph.D., C.P.A., Hospital Service Plan Commission, Chicago

Henry E. Sigerist, M.D., Johns Hopkins Institute for the History of Medicine, Baltimore

E. A. Van Steenwyk, Associated Hospital Service, Philadelphia

Individuals interested in this course, and agencies which might send staff members, can obtain full information about requirements for admission, the curriculum, expenses, etc., by communicating with: Professor Nathan Sinai, Dr.P.H., The School of Public Health, University of Michigan, Ann Arbor, Mich.

NEW CHAIRMAN O.D.H.W.S. COMMITTEE ON NURSING

James A. Crabtree, M.D., the Executive Secretary, Health and Medical Committee, Office of Defense Health and Welfare Services, has announced the appointment of Marion W. Sheahan, R.N., of Albany, N. Y., Director of the Division of Public Health Nursing, New York State Department of Health, as Chairman of the Subcommittee on Nursing of the Health and Medical Committee. This subcommittee was organized in November, 1940, by the Health and Medical Committee, which in turn was set up by executive order of the President in September, 1940. Its purpose is to make over-all studies of nursing needs and to recommend methods of meeting them, as well as to coordinate all stages of the nation's wartime nursing problems. Miss Sheahan is first Vice-President of the N.O.P.H.N. and a member of the Board of Directors of the National Nursing Council for War Services. She succeeds Marion G. Howell, R.N., of Cleveland.

REPORT ON BUTTER SUBSTITUTES BY THE NEW YORK ACADEMY OF MEDICINE

The exigencies of war have created shortages in the availability of certain staple foods, butter among others. The Committee on Public Health Relations of the New York Academy of Medicine has been requested to report on oleomargarine—the present status of its production and of its adequacy as a partial replacement for butter during the present crisis.

The use of oleomargarine in this country goes back for well over half a century. Congress enacted legislation bearing on the subject as far back as 1886, two decades prior to the first Food and Drug Act. The original oleomargarine act was of a purely economic and fiscal nature. Under this act each package must be properly labeled with the word "oleomargarine" in letters three-quarters of an inch high, and the Bureau of Internal Revenue is authorized to levy an excise tax on every merchant selling the product. Every state (particularly the dairy states) has added restrictive provisions of one kind or another, such as taxes ranging from 5 to 15 cents a pound and license fees for manufacturers and venders, and in some instances licenses are necessary for restaurants, hotels and boarding houses serving margarine to their patrons. In half of the states, and this includes New York, oleomargarine cannot be served in institutions receiving tax support or subsidies. Retail license fees, state and federal taxes, state restrictions on the types of fats that may be used, and numerous interstate trade barriers have restricted its sale so that margarine is not sold in two-thirds of the retail food stores of the nation and is not available at all in some states. In many states the sale of yellow margarine is prohibited because of its resemblance to butter. The U. S. Census of Manufacturers of 1939 reports a considerable decline in the output of marga-

rine. This decline applied to all types of margarine whether made solely of vegetable oils or of mixtures of animal and vegetable oils and fats. As of January 1, 1943, however, by order of the War Production Board, margarine manufacturers who previously were allowed to use only 110 per cent of their average consumption of fats and oils in 1940 and 1941, were permitted to raise that figure to 180 per cent.

There has been a great deal of misinformation concerning the product. The motivation has been on purely economic grounds. We have looked into the matter solely from a nutritional and social viewpoint without regard to the economic aspects of the situation.

Definition and Standard of Identity

In June, 1941, the Federal Security Administrator, after a hearing in the matter, promulgated regulations fixing and establishing a definition and standard of identity for oleomargarine which in substance is as follows: Oleomargarine is a food, plastic in form, which consists of one or more of the various specified rendered fats, or of vegetable fats, or of a combination of animal and vegetable fats, mixed with milk or cream. In the preparation of oleomargarine one or more of the following optional ingredients may also be used:

1. Artificial coloring.
2. Sodium benzoate, or benzoic acid, or a combination of these, in a quantity not to exceed 0.1 per cent of the weight of the finished product.
3. Vitamin A, added as fish liver oil or as a concentrate of vitamin A from fish liver oil (with any accompanying vitamin D and with or without added vitamin D concentrate), in such quantity that the finished oleomargarine contains not less than 9,000 United States Pharmacopoeia Units of vitamin A per pound.
4. The artificial flavoring diacetyl added as such, or as starter distillate, or

produced during the preparation of the product as a result of the addition of citric acid or harmless citrates.

5. (a) Lecithin, in an amount not exceeding 0.5 per cent of the weight of the finished oleomargarine; or (b) monoglycerides or diglycerides of fat-forming fatty acids, or a combination of these, in an amount not exceeding 0.5 per cent of the weight of the finished oleomargarine; or (c) such monoglycerides and diglycerides in combination with the sodium sulfo-acetate derivatives thereof in a total amount not exceeding 0.5 per cent of the weight of the finished oleomargarine; or (d) a combination of (a) and (b) in which the amount of neither exceeds that above stated; or (e) a combination of (a) and (c) in a total amount not exceeding 0.5 per cent of the weight of the finished oleomargarine. (The weight of diglycerides in each of ingredients (b), (c), (d), and (e) is calculated at one-half actual weight.)

6. Butter.

7. Salt.

Most manufacturers use vegetable fats, particularly coconut, peanut, and cottonseed oils, in preference to animal fats or oils because these ingredients have less tendency toward rancidity, and they have taken advantage of the regulation permitting the addition to the product of 9,000 units of vitamin A per pound.

From a nutritional viewpoint, when it is fortified with vitamin A in the required amount, oleomargarine is the equal of butter, containing the same amounts of protein, fat, carbohydrates, and calories per unit of weight. Moreover, since the minimum vitamin A content of "enriched" oleomargarine is fixed and the amount of this vitamin in butter may range from 500 to 20,000 units per pound, "enriched" oleomargarine is a more dependable source of vitamin A than is butter. Since it is a cheaper product than butter, fortified oleomargarine constitutes a good vehicle

for the distribution of vitamin A and fats to low-income groups and should therefore be made available to them.

Under the standards set by the Food and Drug Administration, oleomargarine is as clean and sanitary a food as butter. The two products are likewise equal in digestibility. Their relative palatability is a matter of individual taste.

Conclusions and Recommendations

In order that the health of the population may not be impaired by the adoption of a diet insufficient in fats and fat soluble vitamins, the committee recommends that the manufacture, distribution, and consumption of oleomargarine be encouraged and suggests specifically:

1. That the regulations set by the Federal Security Administrator in 1941 be amended to make it mandatory that all oleomargarines be fortified with vitamin A at a uniform level of 9,000 United States Pharmacopoeia Units per pound of finished product;

2. That the War Production Board be requested to allow the use of fats and oils for the manufacture of oleomargarine in such quantities as would offset the necessary withdrawal of butter from civilian use;

3. That federal and state laws which restrict the manufacture and distribution of oleomargarine be suspended for the duration of the butter crisis;

4. That wide publicity, both lay and professional, be given the fact that oleomargarine, fortified by vitamin A, is nutritionally equal to butter; and

5. That this matter be brought to the attention of the President of the United States, the Secretary of Agriculture of the United States and his Technical Assistant on Civilian Requirements, and the Commissioner of Agriculture and Markets of New York State.

CINCHONA FELLOWSHIPS

The Cinchona Products Institute of New York has announced that two

Fellowships are offered for clinical or pharmacological research on quinine or the other alkaloids of cinchona. The Fellowships carry a yearly stipend of \$2,000, plus necessary laboratory or routine expenses. Further details may be secured from the Institute, 10 Rockefeller Plaza, New York, N. Y.

GALLUP POLL TESTS WARTIME EATING HABITS

In order to discover how much the average American adult knows about simple nutrition rules and where an educational program may be needed, the American Institute of Public Opinion recently conducted a nation-wide survey in which a record of the principal foods consumed by representative adults in all states was obtained for a 24 hour period. Results were compared with a list of essential foods recommended by the Bureau of Home Economics of the Agriculture Department and other nutrition experts.

The comparison is shown below. The figures represent the number of persons who ate none at all of the foods listed as necessary daily in each category:

| <i>Food Recommendations</i> | <i>How Adult Americans Live Up to Them</i> |
|---|--|
| Fruits and Raw Greens: tomatoes, citrus fruits or juices, raw cabbage, or salad greens | 45% had none |
| Eggs: 1 a day | 48% had none |
| Milk and/or Cheese | 34% had none |
| Vegetables: leafy green or yellow | 25% had none |
| Meats: meat, fish, or poultry | 12% had none |
| Other Vegetables (including potatoes) or Fruit | 8% had none |
| Cereals or Bread: whole grain or enriched | 3% had none |

"The greatest deficiencies in the national diet are apparently the citrus fruits and raw greens, eggs, and dairy products. Although health authorities recommend one pint of milk a day for adults (one quart for children), more than one-third of all adults in the survey

consumed no milk or ate no cheese. Taking milk alone, the survey found that 43 per cent had consumed none, while 57 per cent included at least some milk in their diet.

"While the Bureau of Home Economics recommends that the foods listed in the table above be eaten every day, it does allow some latitude in consumption of eggs, considering three or four a week sufficient. Although 48 per cent in the survey said they had no eggs, some may have overlooked eggs used in cooking.

"The campaign of health authorities to induce people to eat more leafy green and yellow vegetables is apparently making progress. Three-fourths of all persons in the survey lived up to the rule. The proportion is likewise high for consumption of potatoes, other vegetables (beets, cauliflower, corn, cucumbers, onions, turnips, etc.), and other fruits (apples, bananas, berries, melons, prunes, etc.). That Americans are a nation of meat eaters is likewise shown by the fact that only 12 per cent had no meat, fish or poultry.

"Sharp differences in dietary habits were found by income groups. In the lower group the outstanding deficiencies, as compared to other income groups, were citrus fruits and raw greens; eggs; milk; and leafy green or yellow vegetables.

PERCENTAGE LACKING FOOD REQUIREMENTS

| | <i>Upper Income</i> | <i>Middle Income</i> | <i>Lower Income</i> |
|-------------------------------|---------------------|----------------------|---------------------|
| Citrus Fruits & Greens | 24% | 35% | 56% |
| Eggs | 45 | 43 | 52 |
| Milk, Cheese | 27 | 26 | 40 |
| Vegetables (leafy and yellow) | 19 | 21 | 29 |
| Meats, Fish, Poultry | 7 | 8 | 15 |
| Other Vegetables | 6 | 6 | 10 |
| Cereals or Bread | 3 | 2 | 3 |

"Among geographical sections, the South shows a greater deficiency than any other section in citrus fruits and raw greens, while the New England and

Middle Atlantic area shows greatest deficiency in milk or milk products."

NATIONAL DIET PICTURE BY SECTIONS
Percentage Lacking Food Requirements

| | N. Eng. and M. Atl. | East Cent. | West Cent. | Far South West | |
|-------------------------------------|---------------------------|---------------|---------------|----------------------|-----|
| Citrus Fruits and Greens | 46% | 41% | 43% | 53% | 41% |
| Eggs | 53 | 51 | 49 | 41 | 46 |
| Milk, Cheese | 43 | 31 | 31 | 31 | 28 |
| Vegetables (leafy and yellow) | 28 | 26 | 25 | 21 | 24 |
| Meats, Fish, Poultry | 9 | 12 | 12 | 14 | 14 |
| Other Vege- tables | 8 | 8 | 5 | 12 | 7 |
| Cereals or Bread | 3 | 4 | 2 | 3 | 3 |

REPORT ON SCHOOL HEALTH

A report of the Committee on School Health of the American Academy of Pediatrics, published in the February 20 issue of the *Journal of the American Medical Association*, will have special interest for members of the Maternal and Child Health, the School Health and the Health Education Sections. It proposes a plan of administration through which the professions of education and medicine might work together to educate parents and children to use curative and preventive medicine intelligently. The report includes proposed professional qualifications for medical personnel in the schools. Reprints may be secured from Dr. Clifford G. Grulee, American Academy of Pediatrics, 636 Church Street, Evanston, Ill.

NEWS OF THE O.C.D. MEDICAL DIVISION

Dr. George Baehr, Chief Medical Officer of the Office of Civilian Defense, Washington, has spent two weeks recently in Hawaii at the invitation of the Governor of the Territory and in conference with local authorities on civilian defense activities, which are being reor-

ganized now that the government of the Island is in the process of being transferred from the Army to civil authority.

Dr. Hamilton Southworth of the staff of the Medical Division, O.C.D., has gone to London, England, as a medical liaison officer with the British Office of Home Security.

James M. Landis, the U. S. Director of Civilian Defense, has announced that arrangements have been made for the Civil Air Patrol to fly blood plasma supplies into stricken areas in the event of emergencies.

Dr. Dudley A. Reekie, Boston, Regional Medical Director of the First Civilian Defense Region, has been serving as Chief of the Field Casualty Section of the Medical Division in the absence of Dr. Leonard A. Scheele, who is assigned to special duty.

HEBREW UNIVERSITY WANTS JOURNALS

The Hebrew University Library of Jerusalem is seeking to obtain back numbers of the AMERICAN JOURNAL OF PUBLIC HEALTH in order to complete its files. Will any person having such back numbers or complete volumes who wishes to donate them to the Hebrew University, please communicate with Jerome Trichter, Bureau of Food and Drugs, 125 Worth Street, New York, N. Y. The following are the numbers desired.

| | |
|---------------|--|
| Volume 1 to 8 | (1911-1918)—All numbers |
| 9 | (1919)—No. 2 to No. 12 |
| 10 | (1920)—All numbers |
| 18 | (1928)—No. 8 |
| 20 | (1930)—No. 1 |
| 22 | (1932)—No. 3 and No. 4 |
| 23 | (1933)—No. 2, No. 4, No. 6 to No. 12 |
| 24 | (1934)—No. 9 |
| 25 | (1935)—No. 6, No. 9, No. 11 and No. 12 |

All arrangements for shipping the donated material and costs will be taken care of by Mr. Trichter.

PERSONALS

Central States

FRED P. BESTGEN, M.D.,† formerly of Rapid City, S. D., has been appointed Director of the Hall-Adams Health Unit, Nebraska.

G. C. BROWN, M.D., of Newton, Ill., has joined the Peoria City Department of Health as Clinic Physician for the Well Baby Clinic, Maternity Centre, and the school clinics.

CONRAD A. ELVEHJEM, Ph.D.,† Professor of Biochemistry, University of Wisconsin, Madison, has been awarded the Willard Gibbs Medal by the Chicago Section of the American Chemical Society. It will be presented formally to Dr. Elvehjem May 20.

CORNELIUS A. HARPER, M.D.,* of Madison, retired on January 28 as State Health Officer, a position he has held since April 1, 1904. He has been a member of the Board since February, 1901. CARL N. NEUPERT, M.D., of Madison, who has been Assistant State Health Officer for 6 years, has been named Secretary to the Board of Health and State Health Officer. DR. Harper has been named Medical Specialist in Public Health to the State Board.

VIRGINIA B. HICKERSON, M.D., has been appointed Pediatrics Coördinator for the Anti-Tuberculosis League of Cincinnati and Hamilton County, Ohio, succeeding BARBARA A. HEWELL, M.D.

EDWIN HALL JORRIS, M.D.,† of Madison, Supervisor of Local Health Services and Director of the Division of Tuberculosis Control of the Wisconsin State Board of Health, has been commissioned a lieutenant commander in the medical corps of the U. S. Naval Reserve.

PROFESSOR MAX LEVINE,* of the Department of Bacteriology, Iowa State

College of Agriculture and Mechanic Arts, at Ames, is serving with the Sanitary Corps, having recently been promoted to the rank of Lieutenant Colonel. At present he is in the Brooke General Hospital, Fort Sam Houston, Texas. Three of Dr. Levine's sons are serving in the Army: Lt. Norman D. Levine, Sanitary Corps; Lt. S. Edgar Levine, Engineer Corps; and Lt. Melvin L. Levine, Field Artillery.

STEPHEN V. LUDDY, D.D.S., M.P.H.,† Director of Oral Hygiene in the North Dakota State Department of Health, Bismarck, N. D., resigned January 1, 1943, to accept a position as Director of the Bureau of Dental Health of the West Virginia State Health Department, Charleston, W. Va.

KARL M. MASON has resigned from the staff of the Department of Health of Ingham County, Mich., to accept the position of Public Health Engineer with the Division of Sanitation, of the Peoria, Ill., Department of Health, effective February 15.

HAZELETT A. MOORE, M.D., of Oxford, Ohio, Chairman of the Butler County Board of Health since 1939, has been appointed Health Commissioner of Butler County, succeeding CLIFFORD J. BALDRIDGE, M.D.,† resigned.

JOSEPH B. STOCKTON, M.D., of Cleveland, Ohio, Medical Director of the Cuyahoga County Tuberculosis Dispensary, has been appointed Controller of Tuberculosis for Cuyahoga County.

BUELL H. VAN LEUVEN, M.D.,† of Traverse City, Mich., has been appointed in charge of the new district health unit recently formed when

* Fellow A.P.H.A.

† Member A.P.H.A.

Leelanau County joined with the Grand Traverse County Department of Health, which has functioned since April, 1939.

JAMES F. WILSON, M.D.,† of Washington Court House, Ohio, until recently Health Commissioner of Fayette County and Secretary for many years of the Fayette County Medical Society, has been appointed Health Commissioner of District No. 4 of the Michigan Department of Health, with headquarters in Rogers City, Mich.

ANDREW C. WOOFER, M.D., of Hot Springs, Ia., has been assigned to Iowa by the U. S. Public Health Service to direct the state's venereal disease program during the war period. He succeeds REGNAR M. SORENSON, M.D., C.P.H.,* who is now on active duty with the Reserve Corps of the U. S. Public Health Service at the Iowa State Board of Health, Topeka.

Eastern States

GERTRUDE E. HODGMAN, R.N., who for 2 years has been Director of the Russell Sage College School of Nursing, Troy, N. Y., has been appointed by the Coördinator of Inter-American Affairs as Director of Nurses' Training in the Ministry of Health and Education of Brazil. She will assume the new post in June. Miss Hodgman will be succeeded at Troy by KATHARINE G. AMBERSON, who has been Director of Clinical Nursing Education.

ELLEN C. POTTER, M.D.,* of Trenton, N. J., has been appointed as Director of Medicine and Chairman of the Child Care Committee of the Office of Civilian Defense Director of the State of New Jersey.

MRS. MAX J. H. ROSSBACH is the new Director of Child Care for the American Women's Voluntary Services in New York, N. Y.

Southern States

GEORGE M. COOPER, M.D.,† of Raleigh, has been named President of the North Carolina Academy of Public Health recently organized by the North Carolina State Laboratory of Hygiene, Raleigh, N. C. Dr. Cooper is Assistant State Health Officer and Director of the Division of Health Education, Crippled Children's Work, and Maternal and Child Health Service.

MARIE ELIZABETH F. GENTRY, M.D.,† was recently named Director of the Maternal and Child Health Division of the Austin [Texas] City Health Department, succeeding WILLIAM W. KELTON, JR., M.D.,† who has entered the Army Air Corps.

J. LEE HARWELL, M.D., of Poplar Bluff, Mo., was appointed to the City Board of Health on December 30.

RAYMOND HUSSEY, M.D., Associate Professor of Medicine, Johns Hopkins University School of Medicine, Baltimore, Md., and a member of the Council on Industrial Health, American Medical Association, Chicago, Ill., has been appointed Scientific Director of the new Army Industrial Hygiene Laboratory at Johns Hopkins University School of Hygiene and Public Health. The Laboratory will operate under the direction of the Occupational Hygiene Branch of the Preventive Medicine Division of the Office of the Surgeon General of the Army.

ROY A. KELLY, M.D., of New Roads, La., Director of the St. Charles Parish Health Unit, was recently assigned in charge of the Jefferson Davis Health Unit.

WILLIAM C. D. McCUSKEY, M.D.,† of Wheeling, W. Va., has been appointed a member of the Public Health Council for the term ending June 30,

* Fellow A.P.H.A.

† Member A.P.H.A.

1945, succeeding ALBERT H. HOGE, M.D., of Bluefield, Md.

ABRAHAM OPPENHEIM, M.D.,[†] of Arcadia, La., Director of the Bienville Parish Health Unit, has been appointed in charge of the units in Vermillion and New Iberia Parishes.

RUTH G. TAYLOR, M.A., R.N.,[†] of Washington, D. C., has been appointed Director of the Nursing Unit of the Division of Health Services, U. S. Children's Bureau, Department of Labor, Washington, succeeding NAOMI DEUTSCH, R.N.,* resigned. Miss Taylor has recently been a member of the staff of the International Health Division, Rockefeller Foundation, and has been stationed in Europe. Previously she was Public Health Nursing Consultant of the Children's Bureau, stationed in San Francisco.

Western States

JOHN HALL * has left the Clark County Department of Health, Las Vegas, Nev., to join the Territorial Health Department, Juneau, Alaska.

ANDREW M. HARVEY, M.D., has been appointed Assistant City Health Officer of Long Beach, Calif. He succeeds FREDERICK G. HALL, M.D., who had been Acting Assistant Health Officer under FRANK W. STEWART, M.D.,[†] but who has retired.

F. RUTH KAHL, R.N.,* who has been Public Health Nursing Consultant in U. S. Public Health Service District No. 8, with headquarters in Denver, has been assigned as Nursing Consultant with the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., beginning in January.

JOHN A. KAHL, M.D., M.P.H.,[†] District Health Officer with headquarters at Walla Walla, Wash., has resigned to become Assistant Director of Health of Washington. The

district of which he has been head includes Walla Walla, Benton, and Franklin Counties. At one time Dr. Kahl had served as Director of Local Health for the State Department of Health and as Health Officer of Clark County.

FREDERICK M. PETRIE, M.D., has been appointed Health Officer of Toppenish, Wash., succeeding ANGUS MEAGHER, M.D., who has gone into military service.

DEATH

DR. JOSEPH F. X. STACK, Health Commissioner of Hoboken, N. J., since 1911, died February 17, at the age of 72.

* Fellow A.P.H.A.

† Member A.P.H.A.

CONFERENCES AND DATES

American Association of Industrial Physicians and Surgeons. Hotels Seneca, Sagamore; and Rochester, Rochester, N. Y., May 24-27.

American Association of Social Workers. Cleveland, Ohio. May 22-23.

American Industrial Hygiene Association. Hotels Seneca, Sagamore, and Rochester, Rochester, N. Y., May 24-27.

American Public Health Association—Wartime Public Health Conference and 72nd Annual Business Meeting. New York, N. Y. October 12-14.

American Society of Planning Officials. Joint Meeting of National Conference on Planning and American Institute of Planners. New York, N. Y. Week of May 17.

American Water Works Association—

Canadian Section—Royal Connaught Hotel, Hamilton, Ontario, Can. April 7-9.

Illinois Section—Springfield, Ill. April 8-9.

Ohio Section—Mansfield-Leland Hotel, Mansfield, Ohio. April 12.

Pacific Northwest Section—Bellingham, Wash. May 7-8.

Montana Section—Billings, Mont. May 14-15.

Conference on War Winning Water Works Operations. Carter and Statler Hotels (co-headquarters), Cleveland, Ohio. June 15-18.

Association of Food and Drug Officials of the United States—47th Annual Conference. Cosmopolitan Hotel, Denver, Colo. May 25-28.

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Comparative Speed of Response of Previously Immunized and Non- Immunized Children to Fluid and Alum- Precipitated Diphtheria Toxoid*

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EDWARD BUNNEY, PH.D., F.A.P.H.A., AND
JOHN T. TRIPP, PH.D., F.A.P.H.A.

*Commissioner of Health, Saginaw, Mich.; Director, E. R. Squibb & Sons,
New Brunswick, N. J.; and State Department of Health, Lansing, Mich.*

IN an earlier paper¹ preliminary observations were reported suggesting that those previously immunized would respond quickly to a single injection of either fluid or alum-precipitated diphtheria toxoid. It was felt that this observation might be of value to the health officer faced with an epidemic of diphtheria in a partially immunized community. He might be well advised to give a single injection of fluid or alum-precipitated toxoid to all those with a history of previous diphtheria immunization. This study was designed to give more conclusive evidence on the quickness of the response of previously immunized children and to determine whether there was any difference in the quickness of the response following fluid

as compared with alum-precipitated toxoid.

METHODS

The antitoxin content of the blood of the children was determined just before giving the reimmunization injection and at 5 and 10 days after the injections. A control group of children with no history of previous immunizations were also studied. The reimmunizing injections were 0.5 ml. of fluid or alum-precipitated toxoid, because an earlier study² had shown that either of these procedures was safe and effective in routine reimmunization. The toxoids, the method of bleeding, and the method of antitoxin titration, were the same as used in a previous study.²

RESULTS

The total number of children with a history of previous immunization in-

* Presented before the Diphtheria Committee of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 26, 1942.

TABLE 1
Dates of Original Immunization

| Year | 1930 | '31 | '32 | '33 | '34 | '35 | '36 | '37 | '38 | '39 | '40 |
|--------------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| No. in Group | 5 | 11 | 4 | 1 | 13 | 0 | 23 | 9 | 19 | 23 | 4 |
| Total No. | 112 | | | | | | | | | | |

TABLE 2

Age Distribution at Time of Primary and Reimmunization

| | Age in Years → | | | | | | | | | | | | | | | |
|---|----------------|----|----|----|---|---|----|----|----|----|----|----|----|----|----|-----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Primary Immunization | | | | | | | | | | | | | | | | |
| No. in Group | | 5 | 3 | 7 | 6 | 8 | 35 | 14 | 17 | 12 | 2 | 1 | 1 | 1 | .. | 112 |
| Reimmunization | | | | | | | | | | | | | | | | |
| No. Reimmunized with 0.5 ml. Alum-precipitated Toxoid | .. | .. | .. | .. | 1 | 1 | 6 | 4 | 8 | 10 | 9 | 7 | 5 | 4 | .. | 56 |
| No. Reimmunized with 0.5 ml. Fluid Toxoid | .. | .. | .. | .. | 1 | 2 | 3 | 4 | 5 | 5 | 10 | 8 | 11 | 6 | 1 | 52 |

TABLE 3

Antitoxin Response in a Previously Immunized and in a Non-Immunized Group of Children After Receiving Fluid and Alum-Precipitated Toxoid

| Titer at Reimm. | Immunization Procedure | Reimmunization Procedure | Days after Reimmunization | | | | | | | | | |
|-------------------------------|---|--|---------------------------|-----------------|---------------|--------------|-------------|---------|-----------------|---------------|--------------|-------------|
| | | | 5 Days | | | | | 10 Days | | | | |
| | | | Cases | Less than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More | Cases | Less than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More |
| Less Than 0.001 Unit | Unsatisfactory (One Dose of Fluid Toxoid) | 1 Injection | No. 4 | 1 | 3 | 1 | 1 | 4 | 1 | 3 | 1 | 1 |
| | | 0.5 ml. Fluid Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | | 1 Injection | No. 6 | 5 | 1 | .. | .. | 4 | 3 | 1 | .. | .. |
| | | 0.5 ml. A.P. Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | | 1 Injection 0.5 ml. Fluid or A.P. Toxoid | No. 10 | 6 | 4 | 1 | 1 | 8 | 4 | 4 | 1 | 1 |
| | | % | 60 | 40 | 10 | 10 | .. | .. | .. | .. | .. | .. |
| | Satisfactory (Two Doses or more of Fluid or one or more of A.P. Toxoid) | Not Reimmunized | No. 34 | 33 | 1 | 1 | .. | 130 | 113 | 17 | 10 | 5 |
| | | % | 97 | 3 | 3 | .. | .. | 87 | 13 | 8 | 4 | .. |
| | | 1 Injection | No. 25 | 7 | 18 | 5 | .. | 31 | .. | 31 | 30 | 26 |
| | | 0.5 ml. Fluid Toxoid | % | 28 | 72 | 20 | .. | .. | .. | 100 | 97 | 84 |
| More Than 0.001 Unit | Satisfactory | 1 Injection | No. 22 | 9 | 13 | 6 | 2 | 26 | 2 | 24 | 23 | 21 |
| | | 0.5 ml. A.P. Toxoid | % | 41 | 59 | 27 | 9 | .. | 8 | 92 | 88 | 81 |
| | | 1 Injection 0.5 ml. Fluid or A.P. Toxoid | No. 47 | 16 | 31 | 11 | 2 | 57 | 2 | 55 | 53 | 47 |
| | | % | 34 | 66 | 23 | 4 | .. | 4 | 96 | 93 | 82 | .. |
| | Satisfactory | One Injection 1 ml. A.P. Tox. | No. 19 | 19 | .. | .. | .. | 87 | 65 | 22 | 16 | 15 |
| | | % | 100 | .. | .. | .. | .. | .. | 75 | 25 | 18 | 17 |
| | | 1 Injection | No. 9 | .. | 9 | 4 | 2 | 20 | 1 | 19 | 19 | 19 |
| | | 0.5 ml. Fluid Toxoid | % | .. | .. | .. | .. | .. | 5 | 95 | 95 | 95 |
| | | 1 Injection | No. 10 | .. | 10 | 7 | 4 | 21 | .. | 21 | 21 | 20 |
| | | 0.5 ml. A.P. Toxoid | % | .. | 100 | 70 | 40 | .. | .. | 100 | 100 | 95 |
| Less and More Than 0.001 Unit | Satisfactory | 1 Injection 0.5 ml. Fluid or A.P. Toxoid | No. 19 | .. | 19 | 11 | 6 | 41 | 1 | 40 | 40 | 39 |
| | | % | .. | 100 | 58 | 32 | .. | 2 | 98 | 98 | 95 | .. |
| | | 1 Injection | No. 34 | 7 | 27 | 9 | 2 | 51 | 1 | 50 | 49 | 45 |
| | | 0.5 ml. Fluid Toxoid | % | 21 | 79 | 27 | 6 | .. | 2 | 98 | 96 | 88 |
| | Satisfactory | 1 Injection | No. 32 | 9 | 23 | 13 | 6 | 47 | 2 | 45 | 44 | 41 |
| | | 0.5 ml. A.P. Toxoid | % | 28 | 72 | 41 | 19 | .. | 4 | 96 | 94 | 87 |
| | | 1 Injection 0.5 ml. Fluid or A.P. Toxoid | No. 66 | 16 | 50 | 22 | 8 | 98 | 3 | 95 | 93 | 86 |
| | | % | 24 | 76 | 33 | 12 | .. | 3 | 97 | 94 | 88 | .. |

cluded in the study was 112. The date of their previous immunization experience is given in Table 1.

The age distribution of the children at the time of their primary immunization and of their reimmunization is given in Table 2.

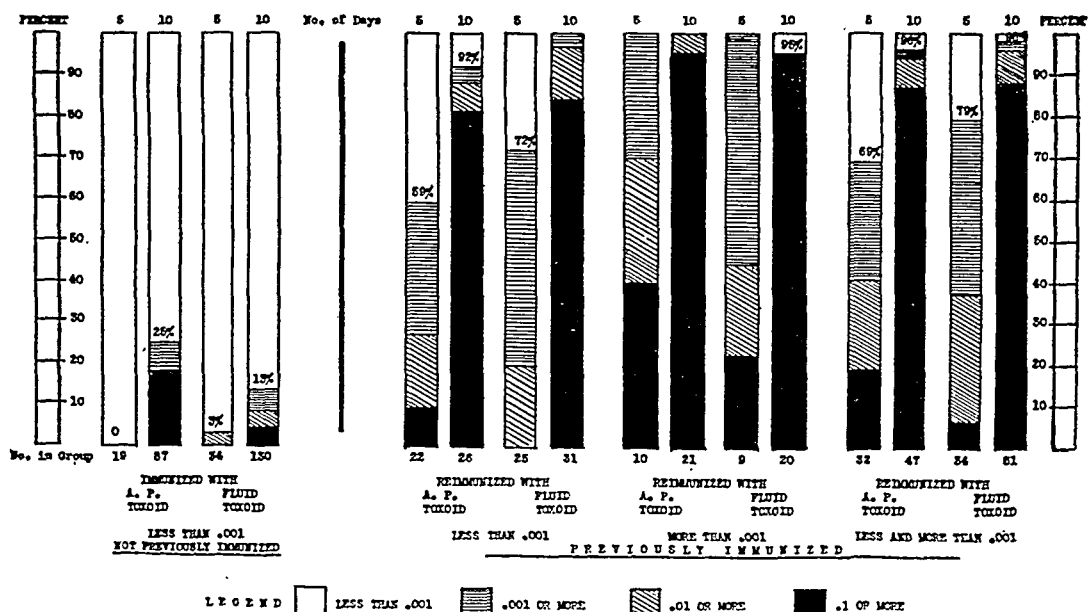
It can be seen that most of the children were 6-9 years of age at the time of primary immunization and were reimmunized approximately 4 years later.

The results of the reimmunization are summarized, and compared with the response to primary immunization, in Table 3.

It can be seen that of 98 children who had previously received a complete immunizing treatment with fluid or alum-precipitated toxoid, and of whom 57 or approximately half had less than 0.001 unit of antitoxin at the time of reimmunization, the injection of 0.5 ml. of fluid or alum-precipitated toxoid re-

sulted in 97 per cent of the children developing 0.001 unit or more within 10 days. Moreover 96 per cent of the 57 children with less than 0.001 unit at the time of reimmunization developed 0.001 unit or more in 10 days. This quick response in a high percentage of previously immunized children is in marked contrast to the response of 87 children with no history of previous immunization and less than 0.001 unit. Only 25 per cent of these developed 0.001 unit within 10 days of similar 0.5 ml. injections of fluid or alum-precipitated toxoid.

There is also a suggestion in Table 3 that fluid toxoid is just as effective as alum-precipitated toxoid in bringing about a quick response in those previously immunized. This is in sharp contrast with the greater effectiveness of alum-precipitated toxoid in primary immunization.



Saginaw County Dept. Health

CHART 1—Comparison of antitoxin response at the end of five and ten days to a single injection of fluid or alum-precipitated toxoid in a group not previously immunized and in a group which previously received a satisfactory immunization
(Two or more doses of fluid or one or more doses of A. P. Toxoid)

The results in Table 3 showing the response after reimmunization of those who had received satisfactory primary immunization are presented diagrammatically in Chart 1. The difference in the rapidity of response between those with and those without primary immunization and having less than 0.001 unit at the time of injection is readily apparent.

At least 59 per cent of those previously immunized have increased from less than 0.001 unit to 0.001 unit or

more within 5 days as contrasted with not over 3 per cent in those tested after primary immunization.

The influence of the nature of the primary immunization on the reimmunization response is evaluated in Table 4.

Although the numbers studied are small it would appear that if at least one injection of alum-precipitated toxoid or 2 injections of fluid toxoid are given in primary immunization a quick response will result in reimmunization of

TABLE 4

Antitoxin Response in a Previously Immunized and in a Non-Immunized Group of Children After Receiving Fluid and Alum-Precipitated Toxoid

(All Cases Having Less Than 0.001 Unit of Antitoxin at Time of Reimmunization)

| Immunization Procedure | | Days after Reimmunization | | | | | | | | | |
|------------------------------------|---|---------------------------|-----------------|---------------|--------------|-------------|--------------|-----------------|---------------|--------------|-------------|
| | | 5 Days | | | | | 10 Days | | | | |
| | | No. of Cases | Less than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More | No. of Cases | Less than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More |
| 1 Injection 1 ml. Fluid Toxoid | Reimmunization Procedure | | | | | | | | | | |
| | 1 Injection | No. 4 | 1 | 3 | 1 | 1 | 4 | 1 | 3 | 1 | 1 |
| | 0.5 ml. Fluid Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 1 Injection | No. 6 | 5 | 1 | .. | .. | 4 | 3 | 1 | .. | .. |
| | 0.5 ml. A.P. Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | (1 Injection of 0.5 ml. Fl. or A.P. Tox.) Total | No. 10 | 6 | 4 | 1 | 1 | 8 | 4 | 4 | 1 | 1 |
| | % | 60 | 40 | 10 | 10 | .. | .. | .. | .. | .. | |
| | Not Reimmunized | No. 34 | 33 | 1 | 1 | .. | 130 | 113 | 17 | 10 | 5 |
| | % | 97 | 3 | 3 | .. | .. | 87 | 13 | 8 | 4 | |
| 2 Injections 1 ml. Fluid Toxoid | 1 Injection | No. 6 | 3 | 3 | 1 | .. | 7 | .. | 7 | 7 | 5 |
| | 0.5 ml. Fluid Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 1 Injection | No. 11 | 7 | 4 | .. | .. | 9 | .. | 9 | 8 | 8 |
| | 0.5 ml. A.P. Toxoid | % | 64 | 36 | .. | .. | .. | .. | .. | .. | .. |
| | (1 Injection of 0.5 ml. Fl. or A.P. Tox.) Total | No. 17 | 10 | 7 | 1 | .. | 16 | .. | 16 | 15 | 13 |
| | % | 59 | 41 | 6 | .. | .. | .. | 100 | 93 | 81 | |
| | Not Reimmunized | No. 0 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | % | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 3 Injections 1 ml. Fluid Toxoid | 1 Injection | No. 8 | 4 | 4 | 1 | .. | 8 | .. | 8 | 8 | 7 |
| | 0.5 ml. Fluid Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | 1 Injection | No. 6 | 1 | 5 | 4 | 2 | 6 | .. | 6 | 6 | 4 |
| | 0.5 ml. A.P. Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | (1 Injection of 0.5 ml. Fl. or A.P. Tox.) Total | No. 14 | 5 | 9 | 5 | 2 | 14 | .. | 14 | 14 | 11 |
| | % | 36 | 64 | 36 | 14 | .. | .. | 100 | 100 | 79 | |
| | Not Reimmunized | No. 0 | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | % | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 1 Injection 1 ml. A.P. Toxoid | 1 Injection | No. 11 | .. | 11 | 3 | .. | 10 | .. | 10 | 10 | 10 |
| | 0.5 ml. Fluid Toxoid | % | .. | 100 | 27 | .. | .. | .. | 100 | 100 | 100 |
| | 1 Injection | No. 5 | 1 | 4 | 2 | .. | 4 | .. | 4 | 4 | 4 |
| | 0.5 ml. A.P. Toxoid | % | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| | (1 Injection of 0.5 ml. Fl. or A.P. Tox.) Total | No. 16 | 1 | 15 | 5 | .. | 14 | .. | 14 | 14 | 14 |
| | % | 6 | 94 | 31 | .. | .. | .. | 100 | 100 | 100 | |
| | Not Reimmunized | No. 19 | 19 | .. | .. | .. | 87 | 65 | 22 | 16 | 15 |
| | % | 100 | .. | .. | .. | .. | 75 | 25 | 18 | 17 | |
| | Total | No. 57 | 22 | 35 | 12 | 3 | 52 | 4 | 48 | 44 | 39 |
| | Reimmunized | % | 39 | 61 | 21 | 5 | .. | 8 | 92 | 85 | 76 |
| | Total | No. 53 | 52 | 1 | 1 | .. | 217 | 178 | 39 | 26 | 20 |
| | Not Reimmunized | % | 98 | 2 | 2 | .. | .. | 75 | 18 | 12 | 9 |

TABLE 5

Responses at Various Intervals Between Original Immunization and Reimmunization

| Reimmunization Agent | Titer at Reimmunization | Titration Intervals | 1 Year | | | | | 2 Years | | | | | 3 Years | | | | |
|----------------------|-------------------------|---------------------|--------------|-----------------|---------------|--------------|-------------|--------------|-----------------|---------------|--------------|-------------|--------------|-----------------|---------------|--------------|-------------|
| | | | No. of Cases | | | | | No. of Cases | | | | | No. of Cases | | | | |
| | | | No. of Cases | Less Than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More | No. of Cases | Less Than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More | No. of Cases | Less Than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More |
| 0.5 ml. Fluid Toxoid | Less Than 0.001 | 5 Days | 1 | .. | .. | 1 | .. | 2 | .. | 2 | .. | .. | 11 | 5 | 5 | 1 | .. |
| | | 10 Days | 1 | .. | .. | .. | 1 | 2 | 1 | 1 | .. | .. | 10 | .. | .. | 1 | 9 |
| | More Than 0.001 | 5 Days | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 2 | .. | 1 | 1 | .. |
| | | 10 Days | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | .. | .. | 3 | .. |
| 0.5 ml. A.P. Toxoid | Less Than 0.001 | 5 Days | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 8 | .. | 3 | 2 | 3 |
| | | 10 Days | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 8 | .. | .. | 1 | 7 |
| | More Than 0.001 | 5 Days | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 8 | .. | 3 | 2 | 3 |
| | | 10 Days | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 8 | .. | .. | 1 | 7 |
| Reimmunization Agent | Titer at Reimmunization | Titration Intervals | 4 Years | | | | | 5 Years | | | | | 6 Years | | | | |
| | | | No. of Cases | | | | | No. of Cases | | | | | No. of Cases | | | | |
| | | | No. of Cases | Less Than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More | No. of Cases | Less Than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More | No. of Cases | Less Than 0.001 | 0.001 or More | 0.01 or More | 0.1 or More |
| 0.5 ml. Fluid Toxoid | Less Than 0.001 | 5 Days | 4 | 3 | 1 | .. | .. | 9 | .. | 6 | 2 | 1 | 2 | .. | 1 | 1 | .. |
| | | 10 Days | 5 | .. | 1 | 2 | 2 | 9 | .. | .. | .. | 9 | 2 | .. | .. | .. | 2 |
| | More Than 0.001 | 5 Days | 2 | .. | 1 | .. | 1 | 5 | .. | 3 | 1 | 1 | .. | .. | .. | .. | .. |
| | | 10 Days | 2 | .. | .. | .. | 2 | 5 | .. | .. | .. | 5 | .. | .. | .. | .. | .. |
| 0.5 ml. A.P. Toxoid | Less Than 0.001 | 5 Days | 1 | .. | .. | 1 | .. | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. |
| | | 10 Days | 1 | .. | .. | .. | 1 | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. |
| | More Than 0.001 | 5 Days | 1 | .. | .. | 1 | .. | 1 | .. | .. | 1 | .. | .. | .. | .. | .. | .. |
| | | 10 Days | 1 | .. | .. | .. | 1 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. |

children with less than 0.001 unit at the time.

One important question is, "How long after primary immunization will children respond quickly to a single 0.5 ml. injection of fluid or alum-precipitated toxoid?" The results are analyzed with this in mind in Table 5.

Here again the figures in each group are small but there is no indication of a falling off in responsiveness after 5 years even in those children with less than 0.001 unit of antitoxin at the time of reimmunization.

DISCUSSION

It would seem reasonable in the light of these results to advise giving a single

0.5 ml. injection to all previously immunized children when faced with a possible diphtheria epidemic in a community either partially or fairly completely immunized. One would expect this procedure to result in the developing within 10 days of adequate immunity in at least 95 per cent of those whose primary stimulation was given less than 6 years before. Responsiveness to reimmunization may very well last longer than 6 years, but this study reports no data on this point.

This procedure may result in the saving of time and money in the control of an epidemic such as that reported by Turner³ where the giving of prophylactic antitoxin to all contacts had to

be resorted to, and where diphtheria persisted over a 26 day period and cases developed in previously immunized children.

The children receiving the reimmunizing injection will have an increase in their antitoxin titer which will protect them for a long time—a decided advantage over the use of prophylactic antitoxin which protects for only a few days and moreover may sensitize the child so as to make subsequent injections of any antitoxin of horse origin difficult if not dangerous.

SUMMARY

At least 97 per cent of a group of 98 previously immunized children receiving a reimmunizing injection of 0.5 ml. of fluid or alum-precipitated diphtheria toxoid developed 0.001 unit or more diphtheria per ml. of serum within 10 days. At least 74 per cent developed 0.001 unit or more within 5 days. Moreover, at least 94 per cent developed

0.01 unit or more and 88 per cent developed 0.1 unit or more within 10 days. Consequently this reimmunizing procedure is recommended for use in the face of a threatening diphtheria epidemic for protection of previously immunized children.

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Public Health Implications in City and Regional Planning*

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BY city and regional planning we seek to control the design and arrangement of the city for convenience, safety, and maximum possible satisfactory living conditions. Three levels of planning are involved: the city or region, the neighborhood, and the relationships of individual structures.

There are public health implications in planning at each of these levels. There is need for open spaces to break up excessive continuity of building masses. There is need for open spaces for recreation, both active and passive. There is need for orderly arrangement to reduce fatigue caused by undue loss of time in travel between home and work, to reduce congestion and confusion in transportation, and to reduce accident hazards. There is need for good neighborhood environment with freedom from the noises, odors, and traffic of commerce and industry, and with opportunity for recreation for different age groups and for normal community life. There is need for sufficient open space between buildings to permit adequate light and air to encourage rest and normal family life.

These are city and regional planning matters because they cannot be secured and permanently preserved by the individual at any cost. They are inadequately provided for in cities today because of haphazard growth prior to the advent of city and regional plan-

ning, and because they will not be provided voluntarily by traditional speculative building processes that furnish about 90 per cent of our dwelling construction.

From the planning viewpoint, these objectives are matters more or less directly related to public health because they reduce the danger of transmission of disease and of accident, because more light, air, and recreation afford opportunity for energy building resistance to disease, because noise, crowding and congestion produce nervous strain, and because pleasant living conditions are less productive of emotional disorders.

If we could design and build a modern city today with a completely fresh start, its design and character would be radically different from the cities we now know. We are greatly handicapped in modern city and regional planning with having to deal with such vast areas of haphazard urban growth. It is infinitely more difficult to replan than to plan anew. An even greater handicap is the inability of government to anticipate changing conditions and to provide quickly the controls needed. You who are engaged in public health activities are well aware of this situation.

Since planning activity is directed both to the correction of mistakes in past development and to the control of new development, the character and effectiveness of planning in each of these categories are markedly different in degree.

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Planning is but one of several forms of administrative activity directed to raising the standards of public health. Hence, in that which follows, there is no attempt to appraise the specific health value of planning actions. There are described certain activities which those engaged in planning believe have certain relation to or implications in public health. If you who are best qualified to judge agree that these implications are tenable, this paper will not have been prepared in vain.

The legal recognition of health implications in city planning is found in the Standard City Planning Enabling Act published by the U. S. Department of Commerce in 1928, and which has now been adopted and is in effect in approximately one-half of the states of the Union. In this act it is provided:

"Sec. 7. Purposes in View. In the preparation of such (city) plan the commission shall make careful and comprehensive surveys and studies of present conditions and future growth of the municipality and with due regard to its relation to neighboring territory. The plan shall be made with the general purpose of guiding and accomplishing a coordinated, adjusted, and harmonious development of the municipality and its environs which will, in accordance with present and future needs, best promote health, safety, morals, order, convenience, prosperity, and general welfare, as well as efficiency and economy in the process of development; including, among other things, adequate provision for traffic, the promotion of safety from fire and other dangers, adequate provision for light and air, the promotion of the healthful and convenient distribution of population, the promotion of good civic design and arrangement, wise and efficient expenditure of public funds, and the adequate provision of public utilities and other public requirements."

In the Standard State Zoning Enabling Act published by the U. S. Department of Commerce in 1926, which act has been adopted in all states, the following language occurs:

"Sec. 1. Grant of Power. For the purpose of promoting health, safety, morals, or the general welfare of the community, the legisla-

tive body of cities and incorporated villages is hereby empowered to regulate and restrict the height, *number of stories*, and *size* of buildings and other structures, the percentage of lot that may be occupied, the *size* of yards, courts, and other open spaces, the *density of population*, and the location and use of buildings, structures, and land for trade, industry, residence, or other purposes."

The daily activities of city planners are directed to the attainment of these objectives, among which it is to be noted that health is a primary consideration. In the preparation and administration of comprehensive city plans, the following prerequisites of public health are kept so constantly in mind that their application becomes virtually automatic:

1. A more orderly development of the city
2. Adequate supply of light
3. Adequate supply of pure air
4. Reduction of congestion
5. Reduction of traffic hazards
6. Reduction of noise, odors, and other nuisances
7. Prevention of slums
8. Improvement of recreational facilities
9. Improvement of residential environment

As stated above, these matters are not the exclusive concern of the city planner. Public health officials and certain administrative officers and agencies are equally concerned. Building codes, sanitary codes, minimum standard housing ordinances, laws regulating the control of nuisances, and such, all are directed toward these same ends. The highest standards of public health will be reached where all of these efforts are coordinated most effectively.

Ways and means employed by city planners in carrying out the objectives enumerated are described below:

1. *A more orderly development of the city—*

Zoning is one of the most important planning tools. By confining single-family dwellings, flats, multiple dwellings, stores and industries to separate districts, and by prescribing maximum

building heights and minimum open space standards for each according to type, we can restore order in the city. This has been accomplished in newer suburban developments which had the advantage of zoning from their inception. This accounts for much of the shift of population from more centrally located older districts. Good order cannot be restored in these older districts, however, without large scale reconstruction.

We have not made most effective use of zoning in cities as yet. Larger districts or zones should be delineated, and greater autonomy in each is needed. Better standards of open space for multiple dwelling areas especially should be adopted and enforced. Speculative pressures for spot zoning by lots or blocks can soon destroy the fundamental values of separation of building types, and may soon lead to the same degree of confusion and conflict produced by haphazard, uncontrolled development.

Much has been said and written about the decentralization trends that have characterized recent city growth. Decentralization, *per se*, will not solve many urban problems. It may create greater problems of transportation and enormous waste in time losses and in the cost of delivery of goods. In city planning we often speak of balanced development of cities by which is meant an orderly design and arrangement which will minimize the wastes of excessive congestion, on the one hand, and of excessive scattering on the other. We have learned much about the wastes of congestion, but we are just beginning to discover some of the wastes incurred by excessive spread of the area of urbanization.

More healthful cities and more efficient and economical cities can be designed if we have the vision and the courage to make bolder comprehensive plans.

2. Adequate supply of light—

Building codes contain regulations for certain window areas in relation to room size where people live and work, with the object of permitting adequate light, air, and sunshine to gain admission to these rooms. Where buildings are close together, or where they are overshadowed by buildings of greater height, the extent of direct admission of sunlight is limited. Building codes control the design of individual buildings, but not the relationships of light and air around buildings or between buildings. In city planning, and especially in zoning regulations, standards are established for certain minimum distances between buildings, which are varied according to the type of district and the height or the length of the building. Prior to zoning, lots in most cities were too narrow, and side yards, if provided, were not required to be in excess of 2 or 3 ft. Such standards of open space are as outmoded as the horse and buggy. Gradually we are increasing the width of side yards through zoning ordinances and in land subdivision regulations to a minimum of 6 or 8 ft. for single-family dwellings, and to 10 ft. or more for multiple dwellings. A minimum distance of 50 ft. between buildings in block interiors is assured in new developments by zoning regulations which require a minimum depth of rear yard of 25 ft. for each building.

When zoning regulations were first undertaken, it was believed that more and more high buildings in cities were inevitable. Subsequent experience has shown that numerous high buildings are neither necessary nor desirable. There is ample land for building in cities without overbuilding in certain sections. In most zoning ordinances building height regulations have been lowered in order to provide for a more uniform development. In the various zones building heights have been adopted which are in harmony with the prevailing type of

building development, $2\frac{1}{2}$ stories for one- and two-family dwellings, 3 stories for most multiple dwellings, from 3 to 12 stories for commercial development, according to location, 8 stories for industry.

By increasing the size of yards and adopting reasonable height regulations, a more ample supply of light and sunshine is assured for individual dwelling structures.

In business districts, the newer types of zoning regulations for building height control limit the height of walls at the street line and invite a pyramidal type of structure, thus affording more satisfactory offices assured of more direct admission of sunlight. Examples of such structures may be seen here in St. Louis. These have building walls at the street line only 2 or 3 stories high, even though the structure rises to several hundred feet in height in the middle of the block.

There is no need for dark, poorly lighted and ventilated rooms in multiple dwellings, and comparatively small need for them in most office buildings except in high value areas of the largest cities. The great progress made in artificial lighting and ventilation is acknowledged. How far this can be substituted for natural light and sunshine it is difficult to determine.

3. *Adequate supply of pure air—*

Where large numbers of people come together in cities, it is important to control those things which interfere with an adequate supply of pure air. By zoning large areas for exclusive residential use, we have reduced contamination of the air by smoke, dust, and odors from commercial and industrial structures in close proximity.

By increasing the size of lots, the minimum width of side yards, and the minimum depth of rear yards, there is greater opportunity for circulation of

air in the community, as well as around the individual structures.

In zoning ordinances and land subdivision regulations, it has become customary to require greater recession of buildings from the street line. Minimum front yard depths of 25 or 30 ft. are becoming the custom rather than the exception. In so doing, the distance between buildings on opposite sides of the street is increased and the long, continuously wide open space thus created improves the opportunity for circulation of air. Where traffic is heavy, and especially where buses and trucks operate in considerable numbers, there is much contamination of the air with fumes and dust. By keeping the dwellings well back from the street lines, occupants are less disturbed by the dust and odors created by street traffic.

By increasing the size of individual lots, yards, and building setbacks, improved opportunity is afforded for the growing of grass, trees, and shrubs. These are beneficial agents in purification of the air.

The older sections of American cities were built so compactly, and land values became so high, that few large community open spaces were provided. With the advent of the automobile, it became possible for much of the urban population to seek less congested living conditions in outlying sections of the city. Many of the older congested districts of the city are now obsolete and must be rebuilt. Where this is done, new open spaces can be provided in the form of parks and parkways, which will afford improved opportunities for air circulation. The new, large housing developments afford much improved standards of light and air for individual dwelling structures. Our studies show that we can rehouse populations in these areas at the same density levels with far less street space, little or no increase in building height, and with a reduction

in land coverage from 60 per cent to as low as 20 or 30 per cent.

Many of the new public housing projects have far less land coverage than was found in the original development. Certainly, no one can see these projects without being impressed with the greatly improved conditions so far as light, air, and sunshine are concerned. The effect upon public health is bound to be tremendously beneficial. Such benefits cannot be secured through reconstruction of individual buildings on individual lots.

4. *Reduction of congestion—*

There is ample land in most cities for building development without unnecessary crowding and congestion. Sir Raymond Unwin's well known paper, "Nothing Gained by Overcrowding," contains convincing proof of this fact. Much overcrowding of the land in cities is the result of speculative pressure rather than of popular demand. New York's Lower East Side contains 250,000 less population today than in 1910. We have lost more than 125,000 population in the area east of Jefferson Avenue in St. Louis. Where population leaves congested areas of cities in such enormous numbers, it is striking evidence of dissatisfaction with living conditions. Inquiries conducted by housing investigators of the City Plan Commission of St. Louis in these older areas disclosed that the principal reasons why occupants desired to leave were all related directly to matters of public health, such as desire for more open space, for grass, trees, shrubs and flowers, for more cleanly conditions, and for a better atmosphere in which to bring up their children.

Excessive population congestion is being controlled through zoning ordinances. In recent years we have found that it is not enough to control the use of land, the type of buildings, the height

of building, the size of yards, and the percentage of lot coverage, but that an equally effective measure of control is the direct regulation of population density through specification of the square feet of lot area per family to be housed in each new building according to the character of the district in which it is to be located. Future overcrowding of land can and will be prevented.

Another device used in many zoning ordinances to prevent overcrowding of land is the prevention of rear lot dwellings in many zoning ordinances. Each building must occupy a separate lot having direct frontage upon a public street or officially approved private street or place.

In zoning ordinances it is provided that new multiple dwelling structures shall be so designed that cellars shall not be used for dwelling purposes. Zoning regulations usually provide, also, that if basements are designed for use as dwelling quarters, the basement shall be considered a story in height measurement.

We no longer regulate building height by measurement in feet, because this led to a reduction in story heights in order to squeeze in a greater number of stories. Zoning height regulations now specify the number of stories permitted in addition to a maximum height measured in number of feet.

Since we have learned more about the undesirability of crowding the land, we are gradually reducing the number of districts and area of districts wherein high buildings are permitted.

There has been excessive overcrowding of the land with high buildings in central business districts of many cities. Two forces have operated to prevent further mistakes of this character. First, it has been found that high buildings are not good financial risks. Second, where many tall buildings are brought together in close proximity, there is excessive crowding of the streets

and transportation facilities. By city planning we have reduced this congestion by opening new and wider streets, thus enlarging the central traffic district, by building by-pass thoroughfares, and by establishing a lower maximum building height limit. These measures have had the effect of spreading new building construction, and thus relieving over-concentration within a small area.

Two important parts of the comprehensive city plan are the major street plan and the transit plan. By opening up new approach thoroughfares to central business districts, and by creating more direct, capacious crosstown thoroughfares, many street traffic congestion problems are solved which could not be solved in any other way. These improved new street plans afford opportunities not only for more expeditious movement of vehicular traffic, but have been designed with a view to providing improved opportunities for movement of mass transportation carriers like street cars and buses. Time-consuming delays and time spent by individuals on mass transportation vehicles have been greatly reduced. As previously stated, however, these time savings may be lost through increasing distances of travel if expansion of the area of urbanization is uncontrolled.

5. *Reduction of traffic hazards—*

American cities were not prepared for the advent of the automobile. For the most part, streets were narrow and were laid out in the familiar gridiron pattern, which assumed more or less uniform use. With the coming of the automobile, the hazard of street accidents was universal. By city planning we developed major street plans, comprised of systems of wide, main thoroughfares to accommodate the great bulk of automobile traffic flow, and thus to reduce the traffic and the hazard in minor residence streets. This differentiation has

been encouraged by reducing the width of pavements on minor streets, by providing less satisfactory surfacing for heavy traffic, and by occasionally blocking off minor streets, some temporarily, some permanently.

While the traffic hazard has been reduced on minor streets, there was a corresponding increase of the traffic hazard on the main thoroughfares. Here traffic control devices have been designed with a view to expediting vehicular traffic and providing safety controls for the pedestrian traffic, including the design and construction of safety islands, loading zones, pedestrian underpasses, and such. Most recent major street plans include designs for superhighways, completely grade-separated, which will still further reduce the traffic hazard for pedestrians. In the design of major streets and superhighways, there is constant attention to plans for reducing traffic hazard to the pedestrian and the motorist, even though the more intricate designs add substantially to total cost.

In the design of new subdivisions, traffic hazards have been greatly reduced through design and arrangement of minor residence streets to feed naturally into main thoroughfares, but so indirect and inconvenient as thus to discourage all but local traffic movements.

In new large-scale housing projects, the design and arrangement of streets and buildings is such that traffic movements can be confined to the periphery of large unit areas, thus greatly reducing the danger of accident.

6. *Reduction of noise, odors, and other nuisances—*

Zoning has prevented additional nuisances in older residence districts, and has permitted new residence districts to develop without objectionable intrusions, whether or not these are nuisances, *per se*.

The total amount of new building development in cities, most of which has taken place in peripheral areas, covers probably from 50 to 100 per cent more land than was occupied by the older city. This more orderly development of these new sections of the city represents an enormous gain to public health because of the opportunity for living and sleeping in a cleaner atmosphere and with greater freedom from the noise and confusion incident to commercial and industrial activity in close proximity thereto.

One device used in new zoning ordinances, which will probably have wider acceptance in future years, is the regulation prohibiting the erection of new dwellings in industrial districts. Surely it is as reasonable to prohibit new dwelling construction in industrial districts as to prohibit industries in residential districts.

Another type of zoning regulation rapidly gaining acceptance is intended to force gradual elimination of any existing non-conforming commercial and industrial uses in single-family dwelling areas. The number of such non-conforming uses is extremely limited—frequently not more than 1 or 2 per cent, measured either in terms of investment, land area, or total number of buildings. These non-conforming uses invite more traffic than is customary in dwelling areas and this traffic increases the noise, confusion, and the hazards of the neighborhood. Frequently they are objectionable for other reasons. By new planning and zoning measures of this nature we can gradually reduce the conflicts between the commercial and industrial uses and the dwelling areas in our cities.

7. Prevention of slums—

Well planned cities must be economically and socially sound in all parts, not merely in certain sections, such as the high value residence districts. By city

planning we have been able to cut new, wide thoroughfares through the city, establish new playgrounds, and even add new small parks in central areas. The slums are still with us, however. By zoning we have segregated uses of land and buildings by districts, and have established improved standards of light, air, and open space. Zoning applies to new construction only, however. It cannot be used to remove slums. City planning commissions have given much consideration to the slum problem, and have played an important part in the slum clearance and large-scale, low-rent housing program of the federal government. But only the surface of this problem has been scratched. What the form of reconstruction shall be is a city planning problem. Whether these areas are used in whole or in part for new low-rent or for medium-rent housing, for parks, for automobile parking areas, for transportation terminals, for industry, or for other uses, is a matter for determination in each city. This is one of the most important current city planning activities. Plans for reconstruction in the central areas, regardless of its character, must provide for a more balanced design form of the city.

It is the particular function of city and regional planning agencies to see that new slums are not created. New development in suburban areas has not always been of high standard. It is a well known fact that new slums are being created on the outskirts of many cities, due to the absence of building codes, zoning ordinances, and health departments with adequate powers. Many of these suburban areas are unincorporated. County governments are frequently without adequate powers to deal with these suburban slums. Regional planning agencies and city planning authorities are taking leadership in bringing to public attention the dangers of such uncontrolled development. They

have encouraged the passage of county planning and zoning measures and building codes. Within quite recent years several such county planning and zoning acts have been passed.

One of the most effective planning tools in such areas is the adoption and enforcement of land subdivision regulations. Through this device it is possible to require land subdividers to install minimum standards of public services such as an adequate supply of pure water, proper sewage disposal facilities, street surfacing, and lighting, before the subdivision is approved and lots are offered for sale. Other requirements include proper design of the subdivision and the grading of streets and lots, so that the place will become a safe and satisfactory place to live, rather than a new slum. With appropriate planning and zoning, including population density control, these newly developing suburban areas can and should be so designed and controlled as to afford higher standards of urban development than have characterized past practices.

8. *Improvement of recreational facilities—*

A city plan encompasses the whole city, and is designed to meet the specific needs of each part. In congested areas, the lack of open space for recreation is so pronounced that more playgrounds and small parks must be provided. In the reconstruction of slums, the planning agencies expect to require incorporation of such open spaces as part of the basic aims in reconstruction.

One of the standards used in city planning practice is to have a minimum of two acres of playground space at each public school, with not less than 100 sq. ft. of play space per child. In new subdivision plats, these standards are being met. Despite the fact that, in the older developed sections of cities such areas have to be condemned at great cost, much progress in attaining

these standards has been made in recent years.

Another objective in city planning is to have a neighborhood park for each square mile of residential development. In the modern city, solid masses of buildings have spread without interruption over such wide areas that there has been small opportunity for rest and enjoyment of small open spaces amid a bit of trees, grass, and open sky. There is no necessity for such continuous spread of solid building development. We need more open spaces in the form of neighborhood parks than have been provided up to the present time. They are shown on our city plans. Even in neighborhoods of large homes it is now generally the practice in planning to require dedication of open areas for recreational use.

Planning authorities have discussed the advisability of breaking up the solid mass of building development in cities by condemning through them great corridors of open space for purposes of improving the circulation of air, adding numerous recreational opportunities, and relieving monotony. The health value of so doing would be very great. Such corridors could be used most advantageously for vehicular and mass transportation purposes. No violence would be done to the city plans, for distances need not be increased appreciably, and a far better organization of the city would be possible. Only the cost involved and the magnitude of the task have prevented greater acceptance and application of this idea. It can still be done. Here is an opportunity of no inconsiderable consequence for consideration in our post-war program.

9. *Improvement of residential environment—*

Good cities which are well planned, healthful places for normal life, can only be achieved by an alert and active citizenry. We cannot have such citizens

where most of them seek to escape the city. The trek to suburban areas has been motivated in part by a desire for personal participation in the control of environment. In many cases this has been accomplished in some degree in the better type of incorporated suburban communities. Too frequently the individual entertains the belief that this participation in the control of environment is impossible in the large cities. This belief is quite valid. If we are to make large cities desirable places of residence, there must be active citizen participation in the control of environment by local unit areas. The large city must be planned as a composite whole, but it must also be planned by neighborhoods. When citizens can have a part in the control of neighborhood environment, we can make substantial gains in community life.

The St. Louis City Plan Commission has divided this city into some 81 residential neighborhoods and 18 industrial districts. It is the hope that in most of these neighborhoods there can be created a community park and school and a community organization that will

take leadership in the improvement of environment, the fostering of community spirit, and a program of community activities.

Time will not permit fuller discussion of this phase of community planning. In this and other cities the scheme is still in the formative stage. It is mentioned merely because its public health implications are such as to warrant much promise of benefits in the psychological factors of family life and social relationships and responsibilities.

CONCLUSION

This brief attempt to discuss the public health implications in city and regional planning was undertaken without full realization of the magnitude of the task. It is hoped that in other more capable hands the subject may be developed in fuller detail and with greater wisdom. Public health officials have been of great assistance in the field of city planning. Your continued interest and participation will be of tremendous value in planning better cities, in gaining public acceptance, and in aiding official implementation of such plans.

A Small Outbreak of Smallpox in Detroit

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IN spite of a known and amply tested preventive, smallpox continues to be reported annually in the United States in shameful numbers. There has been a marked decline in the past decade but there are still too many cases occurring. According to Dauer,¹ for the 20 year period 1900-1919, there were slightly more than 750,000 cases of smallpox reported in the United States. For the next 20 year period 1920-1939, there were 700,000 cases, three-quarters of which occurred between the years 1920 and 1929. The last decade of the latter 20 year period shows a marked decline, but it is interesting to note that the median for the period 1935-1939 was 9,280 cases, a number far in excess of what it should be.

During the interval 1900-1939 a marked change has occurred in deaths attributable to smallpox. The number of deaths recorded during the first 20 year period 1900-1919 was 11,435. For the period 1920-1939 the total deaths were 5,337, of which 90 per cent were recorded between 1920 and 1929. The decline is marked for the period 1920-1939. The favorable change is probably due to the mild type of smallpox (alastrim) now generally prevalent in the United States. According to Chapin and Smith,² alastrim appeared in the United States in 1896, probably having come from Africa to appear first in Florida. Chapin studied the incidence of the classical (severe or malignant)

and of the alastrim (mild) forms of smallpox. The study covered a period of 30 years (1900-1929). The number of cases of alastrim approximated 1,250,000, and during the same interval there were 57,000 cases of the classical type. The fatality rates for the alastrim and classical types were respectively 0.56 and 16.40.

From a study of the trend during the past four decades, it is evident that the severe type of smallpox is decreasing in incidence, and accompanying this decline is a decrease in the number of deaths. Although there is no evidence that alastrim reverts to the classical type of smallpox, the latter is still present and may reappear any time in epidemic form. A large outbreak is possible but not probable on the face of it, but less attention to vaccination and the present rapid change in population groups might prepare the soil for an outbreak or result in an increase in cases and deaths. This possibility is well illustrated by the past experience of Minnesota.³ This state passed an anti-compulsory vaccination law in 1903, and during the first 20 years after it took effect the average annual number of cases reported was 3,000. The public worried little about the situation, for smallpox was mild and few deaths resulted. However, in 1924 malignant smallpox was imported from Canada and a large unvaccinated population was exposed, so that within 20 months

4,041 cases and 504 deaths were reported. As a test of the effectiveness of vaccination a survey showed that only 72 of the cases had previously been successfully vaccinated and only 1 death occurred in this group. Of the remainder (3,969 cases), roughly 85 per cent (3,442) had never been successfully vaccinated, while the remaining 15 per cent gave an indefinite history. Following the outbreak, thousands of persons were vaccinated and during the next 10 years the annual number of reported cases dropped from 3,000 to 225.

It is estimated that between the years 1925 and 1938 some 625,000 infants were born in the state of Minnesota. Many of these infants were not vaccinated because the public had become apathetic again to the necessity for the procedure. To the health worker it was apparent that it would be merely a question of time before the natural consequence of insufficient vaccination would result in a rise in cases and per-

haps an outbreak. The expected rise in cases did materialize. In 1936 the total reported cases of smallpox in Minnesota was 397; in 1937, 671; and in 1938, 859. There was a decrease in 1939, however, the total being 492. Whether this favorable lessening of cases will continue, only time will tell.

Michigan's experience has been similar to that of Minnesota except for a rise in 1939 rather than a decline. The total cases for Michigan were lower: 118 in 1937, 365 in 1938, and 615 in 1939.

In general, the average annual case rates for smallpox have been very low in the eastern states, particularly in the New England, middle Atlantic, south Atlantic, and the east south central states. The highest rates have been noted in the east north central, west north central, mountain, and Pacific states, with somewhat lower rates in the west south central states.

The State of New Jersey with a popu-

TABLE 1
Smallpox in the United States
1920-1941

| Year | Cases* | Deaths* | Fatality Rate |
|------|---------|---------|---------------|
| 1920 | 110,672 | 492 | 0.44 |
| 1921 | 108,487 | 758 | 0.69 |
| 1922 | 33,305 | 901 | 2.70 |
| 1923 | 30,890 | 165 | 0.53 |
| 1924 | 56,513 | 896 | 1.58 |
| 1925 | 40,281 | 724 | 1.79 |
| 1926 | 32,694 | 387 | 1.18 |
| 1927 | 38,977 | 151 | 0.39 |
| 1928 | 39,396 | 141 | 0.35 |
| 1929 | 42,282 | 179 | 0.42 |
| 1930 | 48,907 | 182 | 0.37 |
| 1931 | 30,151 | 108 | 0.36 |
| 1932 | 11,194 | 50 | 0.44 |
| 1933 | 6,491 | 39 | 0.60 |
| 1934 | 5,371 | 24 | 0.44 |
| 1935 | 7,957 | 25 | 0.31 |
| 1936 | 7,834 | 35 | 0.44 |
| 1937 | 11,673 | 34 | 0.29 |
| 1938 | 14,939 | 46 | 0.31 |
| 1939 | 9,877 | 38 | 0.38 |
| 1940 | 2,795 | 15 | 0.53 |
| 1941 | 1,396 | 12 | 0.85 |

* Data from Dauer (*loc. cit.*)

Data through courtesy of E. R. Coffey, Assistant Surgeon General, Division of Sanitary Reports and Statistics, U. S. Public Health Service

lation of 4,400,000 reported not a single case during the period 1931 through 1938, while the States of North Dakota, South Dakota, Montana, Idaho, Oregon, Wyoming, and Utah, with a combined population similar to that of New Jersey, reported 12,666 cases during the same period. Three states in the above group prohibit compulsory vaccination by statutory regulation regardless of prevailing circumstances.

Table 1 shows the number of reported cases of smallpox in the United States during the years 1920 through 1941. Marked variations are noted in the number of cases by individual years. In 1920 there were 110,700 cases, but by 1922 the number had dropped two-thirds. The deaths from smallpox in 1920 were 490 but in 1922 the number was 900. A study of the table will show fluctuations from year to year in the case column. From 1924 on, the number of deaths decreased progressively; exceptions are 1929 and 1930 and 1936 to 1940, the number of deaths recorded for these periods exceeding the years just preceding.

Table 2 shows the incidence of smallpox in the period 1932-1941 in relation to state vaccination laws. In states where vaccination is required as a prerequisite to school attendance, the average annual case rate per 100,000 of the population was in every instance under that noted for the 7 states where compulsory vaccination is prohibited by law. The average annual case rates for the latter states is more than 13 times greater than the average for the group where vaccination is prerequisite to school attendance.

LOCAL INCIDENCE OF SMALLPOX

The incidence of smallpox in the City of Detroit for the period 1920-1941 is shown in Table 3. It will be noted that this city had two large outbreaks in the interval. One occurred in 1920 with 1,125 cases and 4 deaths. The smallpox

TABLE 2
*Incidence of Smallpox in Relation to State
Vaccination Laws **
1932-1941

| <i>Vaccination Required as Prerequisite to School Attendance</i> | <i>Average Annual Case Rate per 100,000 Population</i> |
|--|--|
| Arkansas | 7.6 |
| Kentucky | 4.3 |
| Maryland | under 0.1 |
| Massachusetts | 0.1 |
| New Hampshire | 0.5 |
| New Mexico | 6.3 |
| Pennsylvania | under 0.1 |
| Rhode Island | 0.0 |
| South Carolina | 0.8 |
| Virginia | 0.4 |
| West Virginia | 1.4 |
| Average for 11 states | 1.96 |
| <i>Compulsory Vaccination Forbidden by Law</i> | |
| Arizona | 14.8 |
| California | 10.4 |
| Minnesota | 15.6 |
| North Dakota | 35.8 |
| South Dakota | 48.2 |
| Utah | 14.1 |
| Washington | 36.4 |
| Average for 7 states | 25.0 |

* Data on vaccination laws from Fowler, W., *Pub. Health Rep.*, 56:167 (Jan. 31), 1941.

Annual Case Rates were calculated from data in Table 2, Dauer: by H. E. Pearson, Department of Epidemiology, School of Hygiene and Public Health, University of Michigan.

during this outbreak was the alastrim type, but the smallpox encountered in 1924 was more severe and, according to Dr. Henry F. Vaughan, Health Commissioner of Detroit at the time, it appeared that both alastrim and the classical types of smallpox were occurring at the same time. It is certain that the classical type was represented and by its worst form, hemorrhagic smallpox. Every person developing the hemorrhagic type of smallpox expired. In 1924 there were 1,610 cases and 163 deaths. From 1924 on, the annual number of cases was less than 100, with the

TABLE 3
Smallpox, Detroit
1920-1941

| Year | Cases Reported | Deaths | Cases Reported per 1,000 Population | Deaths per 100 Cases Reported | Death Rate per 100,000 Population |
|------|----------------|--------|-------------------------------------|-------------------------------|-----------------------------------|
| 1920 | 1,125 | 4 | 1.10 | 0.4 | 0.4 |
| 1921 | 846 | 2 | 0.90 | 0.2 | 0.2 |
| 1922 | 85 | 0 | 0.09 | 0.0 | 0.0 |
| 1923 | 256 | 0 | 0.24 | 0.0 | 0.0 |
| 1924 | 1,610 | 163 | 1.42 | 10.1 | 14.4 |
| 1925 | 66 | 12 | 0.05 | 18.2 | 0.9 |
| 1926 | 14 | 0 | 0.001 | 0.0 | 0.0 |
| 1927 | 43 | 0 | 0.03 | 0.0 | 0.0 |
| 1928 | 50 | 0 | 0.036 | 0.0 | 0.0 |
| 1929 | 75 | 0 | 0.052 | 0.0 | 0.0 |
| 1930 | 151 | 0 | 0.095 | 0.0 | 0.0 |
| 1931 | 42 | 0 | 0.028 | 0.0 | 0.0 |
| 1932 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| 1933 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| 1934 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| 1935 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| 1936 | 13 | 0 | 0.0008 | 0.0 | 0.0 |
| 1937 | 15 | 0 | 0.0009 | 0.0 | 0.0 |
| 1938 | 2 | 0 | 0.00012 | 0.0 | 0.0 |
| 1939 | 0 | 0 | 0.0 | 0.0 | 0.0 |
| 1940 | 15 | 0 | 0.009 | 0.0 | 0.0 |
| 1941 | 6 | 0 | 0.0004 | 0.0 | 0.0 |

exception of 1930 when 151 cases were reported. Beginning with 1932 there have been 5 years with no cases reported, and from 1926 on no deaths have been recorded. The case incidence has been low since 1932, the highest number reported in the period has been 15, noted in 1937 and 1940.

DATA—SMALLPOX OUTBREAK, 1940

Small outbreaks still occur from time to time as amply demonstrated by the experience in the state at large, and by the following occurrence of cases noted in Detroit during the fall and winter of 1940-1941. The cases listed in Table 4 comprise a group of persons with smallpox and are listed in sequence according to their discovery. The listing includes sex, age, date of diagnosis, date of rash, vaccination status, diagnosis, date and by whom diagnosed. In the column "remarks" will be found data which served as clues to the solution of the occurrence of smallpox among a rather widely scattered number of cases and served also to uncover likely cases which had occurred previously but which

verified except by history of contact.

The first case, G. F., came to the attention of the Health Department when the occupants of the upper portion of an income bungalow asked for instructions with respect to their exposure to the owner of the dwelling who had a rash. The owner had been ill at home with what had been diagnosed as chicken pox and had on several occasions, while ill, used the telephone of the upstairs occupants. The latter had become suspicious that the rash might not be chicken pox. Upon investigation smallpox was discovered in 4 members of the family.

The probable sequence of cases which are connected to one another by definite contact and shown by interval, well within the limits of the incubation period, is shown in Table 5 and Chart 1.

The first case in the series to come to the attention of the Health Department was discovered on December 11, 1940, almost 2 months after the so-called first case. The source of infection in C. P. (1) could not be determined and she

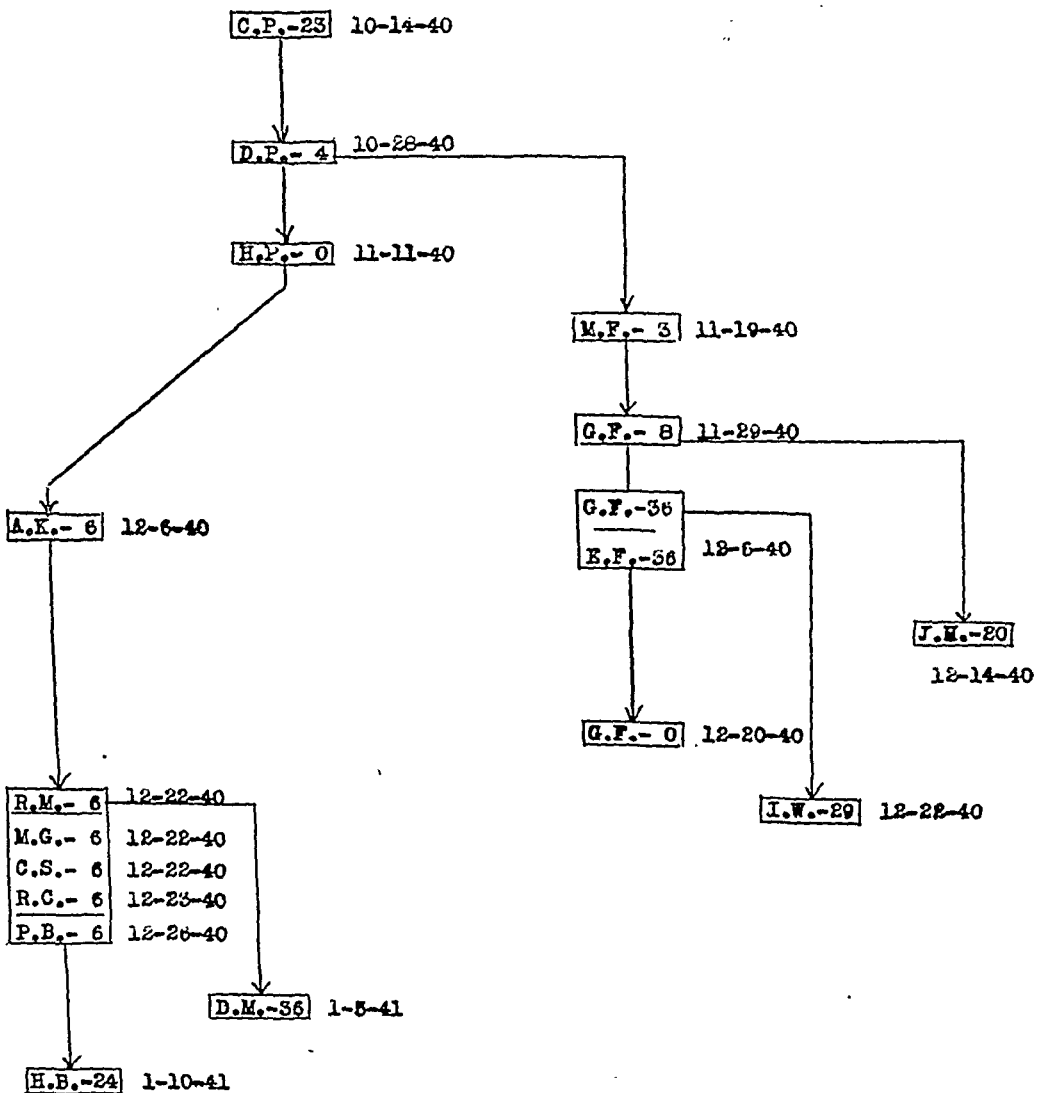
TABLE 4
Smallpox Outbreak in Detroit, 1940

| Cas. No. | Name | Address | Sex | Age | Date of Diagnosis | Date of Rash | Status of Vaccination | Diagnosis | By Whom | Date | Remarks |
|-------------|-------|-----------|-----|-----|----------------------|-----------------|--|------------|--------------|----------|---|
| 1 | G. F. | 14 M. St. | M | 36 | 12-11-40 | 12- 6-40 | Many times; no take | Chickenpox | Priv. phys. | 12- 4-40 | First came to attention of Health Dept. when neighbors asked for in- structions on exposure to a man with a diffuse rash |
| 2 | E. F. | 14 M. St. | F | 36 | 12-11-40 | 12- 6-40 | No record or evidence of | Chickenpox | Priv. phys. | 12- 4-40 | Wife of G. F. (1); sister of C. P. (5); aunt of A. K. (8) |
| 3 | M. F. | 14 M. St. | F | 4 | 12-11-40 | 11-19-40 | No record or evidence of | Chickenpox | Priv. phys. | 12- 4-40 | Daughter of G. F. (1); and E. F. (2) |
| 4 | G. F. | 14 M. St. | F | 8 | 12-11-40 | 11-29-40 | No record or evidence of | Chickenpox | Priv. phys. | 12- 4-40 | Sister of M. F. (3); daughter of G. F. (1); and E. F. (2) |
| 5 | C. P. | 8 D. St. | F | 23 | 12-12-40 | 10-14-40 | No record or evidence of | Chickenpox | Priv. phys. | 10-16-40 | Sister of E. F. (2); laun- dry worker; no second- ary cases among fellow workers |
| 6 | D. P. | 8 D. St. | F | 4 | 12-12-40 | 10-28-40 | No record or evidence of | Smallpox | Health Dept. | 12-12-40 | Niece of C. P. (5) |
| 7 | H. P. | 8 D. St. | M | ½ | 12-12-40 | 11-11-40 | No record or evidence of | Chickenpox | Chiropractor | 11-12-40 | Nephew of C. P. (5) and brother of D. P. (6) |
| 8 | A. K. | 8 H. St. | M | 6 | 12-12-40 | 12- 6-40 | Only unvacci- nated mem- ber of fam- ily of 5 | Smallpox | Health Dept. | 12-12-40 | Had only a few lesions when seen—was a mild case; frequent contact with P. family; 1st Grade in "C" school; did not attend school after 12-6-40 |
| 9 | J. H. | 14 M. St. | M | 20 | 12-14-40 | 12-14-40 | No record or evidence of | Smallpox | Health Dept. | 12-14-40 | Nephew of G. F. (1), who became resident at present address 9-1940 |

TABLE 4 (Continued)
Smallpox Outbreak in Detroit, 1940

| Case No. | Name | Address | Sex | Age | Date of Diagnosis | Date of Rash | Status of Vaccination | Diagnosis | By Whom | Date | Remarks |
|----------|------|-----------|-----|-----|-------------------|--------------|---|-----------|--------------|----------|--|
| 10 | C.F. | 14 M. St. | M | ½ | 12-26-40 | 12-20-40 | Done 12-12-40; "take" | Smallpox | Health Dept. | 12-26-40 | Mild case |
| 11 | R.M. | 6 V. St. | M | 6 | 12-27-40 | 12-22-40 | No record or evidence of | Smallpox | Health Dept. | 12-27-40 | 1st Grade in "C" school |
| 12 | M.G. | 7 G. St. | F | 6 | 12-28-40 | 12-22-40 | No record or evidence of | Smallpox | Health Dept. | 12-28-40 | 1st Grade in "C" school |
| 13 | P.B. | 9 W. St. | F | 6 | 12-28-40 | 12-26-40 | No record or evidence of | Smallpox | Health Dept. | 12-28-40 | 1st Grade in "C" school |
| 14 | R.C. | 9 S. St. | M | 6 | 12-28-40 | 12-23-40 | No record or evidence of | Smallpox | Health Dept. | 12-28-40 | 1st Grade in "C" school |
| 15 | C.S. | 8 C. St. | F | 6 | 12-28-40 | 12-22-40 | No record or evidence of | Smallpox | Health Dept. | 12-28-40 | 1st Grade in "C" school |
| 16 | I.W. | 22 E. St. | M | 29 | 12-28-40 | 12-22-40 | No record or evidence of | Smallpox | Health Dept. | 12-28-40 | Brother of E. F. (2), whom visited on 12-8-40 |
| 17 | D.M. | 6 V. St. | M | 36 | 1-6-41 | 1-5-41 | Vaccinated on 12-27-40; "take" | Smallpox | Health Dept. | 1-6-41 | Father of R. M. (11); hospitalized 12-27 because of breaking quarantine reg.; remained in hosp. during illness |
| 18 | H.B. | 6 H. St. | M | 24 | 1-12-41 | 1-10-41 | Refused vac. 3 days after exposure, but done 12-31-40; "take" on 1-5-41 | Smallpox | Health Dept. | 1-12-41 | Uncle and contact of P. B. (13) |

CHART 1—Smallpox Outbreak in Detroit, 1940
Probable Source of Cases Showing Age and Date of Rash



COMMENT

The outbreak occurred principally in families closely related by blood but all the families involved were not on good terms with one another. It was difficult to get reliable information. First, because the affected individuals did not believe they had smallpox and second, the persons involved knew that restrictions for smallpox were far more stringent than for chicken pox. Repeated

visits to the F. and P. families resulted in the discovery of the case A. K. (6) who was really responsible for several of his school mates contracting the disease, two of whom each gave rise to one additional case. The K. family did not tell the same story twice and only on threat of severe restriction for all members (remainder of family previously vaccinated and had good scars) would they implicate others.

TABLE 5
Smallpox Outbreak in Detroit, 1940

| Discovery Sequence Number (Table 4) | Actual Sequence Number | Case | Sex | Age | Probable Infesting Case | Interval Rash Infesting Case to Rash Secondary Case | Remarks |
|--|------------------------------|-------|-----|-----|-------------------------------|--|--|
| 5 | 1 | C. P. | F | 23 | ..... | ..... | ..... |
| 6 | 2 | D. P. | F | 4 | C. P. (1)* | 14 days | ..... |
| 7 | 3 | H. P. | M | 0 | D. P. (2) | 14 days | ..... |
| 3 | 4 | M. F. | F | 4 | D. P. (2) | 22 days | D. P. (2) visited F. family during D. P.'s illness |
| 4 | 5 | G. F. | F | 8 | M. F. (4) | 10 days | G. F. exposed to cousin D. P. (2) but probably did not contract smallpox from her; Ages: D. P. (2) 4 yrs., G. F. 8 yrs. |
| 1 | 6 | G. F. | M | 36 | M. F. (4) or G. F. (5) | 17 days 7 days | Most likely source M. F. (4) |
| 2 | 7 | E. F. | F | 36 | M. F. (4) or G. F. (5) | 17 days 7 days | Most likely source M. F. (4) |
| 8 | 8 | A. K. | M | 6 | H. P. (3) | 25 days | A. K. frequently visited P. family. No history of contact with F. family, also relatives. Interval long but rash and crusts may persist for 10-21 days |
| 9 | 9 | J. H. | M | 20 | M. F. (4) or G. F. (5) | 25 days 15 days | Nephew of G. F. (6) and lived with F. family |
| 10 | 10 | C. F. | M | 0 | G. F. (6) or E. F. (7) | 14 days 14 days | ..... |
| 16 | 11 | I. W. | M | 29 | G. F. (6) or E. F. (7) | 16 days 16 days | Visited F. family 12-8-40 |
| 11 | 12 | R. M. | M | 6 | A. K. (8) | 16 days | In same grade and section in "C" school |
| 12 | 13 | M. G. | F | 6 | A. K. (8) | 16 days | In same grade and section in "C" school |
| 13 | 14 | P. B. | F | 6 | A. K. (8) | 20 days | In same grade and section in "C" school |
| 14 | 15 | R. C. | M | 6 | A. K. (8) | 17 days | In same grade and section in "C" school |
| 15 | 16 | C. S. | F | 6 | A. K. (8) | 16 days | In same grade and section in "C" school |
| 17 | 17 | D. M. | M | 36 | R. M. (12) | 14 days | Father of R. M. (12) |
| 18 | 18 | H. B. | M | 24 | P. B. (14) | 15 days | Uncle of P. B. (14) |

* Actual sequence number

No case in this outbreak had previously been successfully vaccinated. Mr. F., father of the F. family, had been vaccinated many times previously without a successful take. In the F. family (6 members) the only person to escape the infection was a son aged 14 who was successfully vaccinated at school in 1937 and who showed a good scar. In

the K. family (5 members) the only person to contract smallpox was the unvaccinated member, a boy of 6 (case A. K. (8)).

The outbreak was slow in evolution, attesting to the mildness of the disease. In the P. family there were 3 cases in sequence at intervals of 2 weeks apart. The F. family group, 6 cases (including

J. H. (9)) occurred in the following sequence: 1—1—3—1.

Actual sequence Cases 1, 4, 5, 6, and 7 were seen by a physician and diagnosed chicken pox. Case 3 was seen by a chiropractor and diagnosed chicken pox. Cases 3 and 8 were not seen by a physician. Again, the first cases in the F. family (cases 4, 5, 6, and 7) were all seen by the same physician on the same day and diagnosed chicken pox. No subsequent calls were made by the physician and had the patients been seen at a later date it is possible that the real condition would have been diagnosed. G. F. (6) could not have been lightly mistaken at the end of the first week of the rash. He felt quite ill and was confined to bed. His wife, E. F.

(7) had few symptoms, relatively few lesions, and was up and about throughout the course of her illness. Patient A. K. (8) had no more than 20 lesions, well scattered and crusted when seen, but the lesions were shot-like to the touch and suspicious looking. The relative mildness of the infection and paucity of the lesions in some instances made a diagnosis of smallpox on one visit difficult to make.

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Integration of Medical Care into the Health Program in Rural Missouri*

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IN many urban communities, serious and partly successful efforts have been made to administer services of medical care for indigents and for the low income group. In rural areas, however, this is essentially an unsolved problem and the experience in Missouri is offered as of possible interest and aid to others working under somewhat similar conditions.

In order to understand developments in this state, it is necessary that certain fundamental legal provisions and limitations be set forth. As is the case in many southern states, the county courts are in reality the business agents for the counties. They conduct financial affairs and determine appropriations for all matters, including public health and medical care. They sit as a judicial body only when indigents come before them for commitment or admission to state institutions: hospitals for the care of the insane, feeble-minded, cancer, tuberculosis, and orthopedic conditions. Of great importance is the fact that the care of the indigent sick, by statute, is the concern of the county court. Section 9590, Revised Statutes, 1939, reads as follows: "Poor persons shall be relieved, maintained, and supported by the county of which they are inhabitants." Because of this

legal requirement, because of the qualities inherent in a situation where one is ill and without care, and because of popular demand, the care of the sick is of much greater concern to the county courts in Missouri than is the problem of preventive medicine, and if placed in the position of a county judge who depends for his job upon the support of the electorate, most of us would take the same stand that he does.

The majority of counties, therefore, have attempted in the past to meet this obligation one way or another, usually by the appointment of part-time county physicians, and by court action to decide which cases are to be seen by the county physicians, which may go to hospitals, and length of hospitalization for which the county will pay in each individual case. It is obvious that under such a system medical care might be efficient here and unsatisfactory there, or excessively costly in some counties with practically no expenditures in others, these things depending on the custom of the individual county, its financial ability to pay for the service, and on other factors.

For all practical purposes the county revenue is derived only from taxation of real estate and personal property. After the assessment has been made the court fixes the tax levy. However, the maximum levy in any county is set by the State Constitution, so that the available funds for county opera-

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tion are definitely limited and can be easily determined. The maximum rates per \$100 valuation that can be levied for all purposes depends upon the total assessed valuation of the county and are as follows:

| <i>Counties with Valuation:</i> | <i>Per \$100 Assessed Valuation</i> | <i>Counties in Group</i> |
|-------------------------------------|---|----------------------------------|
| 0- 5,000,000 | may levy .50 | 21 |
| 6,000,000- 9,000,000 | " " .40 | 14 |
| 10,000,000-30,000,000 | " " .50 | 68 |
| 30,000,000 and over | " " .35 | 11 |

To complicate the matter further, there exists a state-county budget law under which each county must conduct its financial business. The county budgets are prepared annually by the county court upon the basis of anticipated revenue. This is estimated by applying the tax rate set by the court against the total assessment. The budgets must be made up and all expenditures made according to six classifications, and in the following order:

1. Maintenance of county patients in insane institutions
2. Cost of courts and elections
3. Repair and maintenance of bridges on other than state highways
4. Salaries of elected officers, their deputies, and office supplies
5. General
6. Repairs, replacements, equipment

By the time the expenditures necessary to maintain the first four classes are allotted, little money remains in class five from which all county functions, not listed in the four preceding classes, must be maintained. It then becomes obvious that the average county, under existing tax laws, cannot support two health services, one curative and the other preventive, and where only one service can be provided it naturally is the curative.

To meet the situation there grew up in some of the county health units a feeling of responsibility for the medical care of the indigent population for which nothing was being done, and

their programs gradually changed to include general medical clinics, obstetrical service, hospital care, special clinics such as eye, ear, nose and throat, and medical care of the inmates of the county jail and county farm. In such a program, the county health unit not only served as the central administrative agency of all health activities within the county, but the health officer soon became the medical adviser to the county court and to other elected officials. The medical decisions were made a responsibility of the health officer rather than of the county court. The first one of these units so to function developed in 1925, the second in 1930, and in both of them the health officers actually did the medical work themselves until the depression years forced the addition of part-time medical assistants to the staff. Neither of these units, however, has ever had adequate personnel to render completely satisfactory services in all branches.

Realizing that the development of new units was dependent upon availability of funds and that only limited county funds were available, and recognizing further that medical care came first with the county judges, state assistance to counties was increased and combined medical care and health programs were urged. The present maximum tax levies permitted the counties by law make it impossible for the 35 counties with valuation of less than 10 million to contribute 50 per cent of the cost of a four piece unit, and only counties of at least 20 million assessed valuation can supply 50 per cent of the budget of a combined unit. More people are required to conduct a combined program but usually medical aid on a part-time basis has been obtainable and has been satisfactory. When one of the larger counties was approached regarding the development of a health unit the answer was that no funds were avail-

able. Upon investigation of county records, however, it was found that the court had been expending \$12,500 annually on indigent medical care, given by 2 part-time physicians, plus drugs and hospitalization under direction of the county judges. The court was again approached on establishing a combined unit using their \$12,500 budgeted for medical care to which was added \$10,000 state assistance, which they accepted. These two funds totaling \$22,500 then provided the county with a full-time health unit. The personnel consisted of a health officer, 4 nurses, engineer, clerk and the same 2 physicians as part-time assistants. The unit was housed in a building of its own with ample space in which to conduct all its program.

Many times the question has been asked if public health did not suffer in such a program. The answer is yes, but the county had no health services at all before organization of the unit. To answer the question of how much time was devoted to medical care, a short-time study was recently made in three units (Greene, Jasper, and Laclede Counties) to determine the proportion of time spent by the entire staff on administration, on conventional public health activities, and on medical care. These three counties were selected because of differences in the age of the units, size of the staffs, and their location. The Greene County Unit was established in 1925. The county's population of 29,303, surrounds a city

of 60,000. The unit's program includes residents of the city in venereal disease and tuberculosis control (see Table 1).

TABLE 1

Population and Per Capita Budget

| | <i>Population 1940</i> | <i>Total Budget 1943</i> | <i>Per capita Budgeted</i> |
|---------|----------------------------|------------------------------|--------------------------------|
| Greene | 29,303 | \$28,130.00 | 0.958 |
| Jasper | 30,979 | 25,440.00 | 0.820 |
| Laclede | 18,718 | 18,450.00 | 0.985 |

The Jasper County Unit was established in 1940. It serves a population of 30,979 outside the limits of two municipalities of 37,144 and 10,585 population, but includes control of venereal disease and tuberculosis within the two cities. These two counties are, therefore, similar in many respects.

Laclede County by way of contrast is or was a purely agricultural community of 18,718. The largest town in the county has a population of 5,000. The establishment of Fort Leonard Wood in the adjoining county created new problems for Laclede County and resulted in the establishment of the county unit in 1941.

The personnel making up these three units naturally varies in number (Table 2) with the population served and increases apparently as the age of the unit increases.

The time studied was a 2 weeks period, September 21 to October 5, 1942. The units were visited on Friday and requested to begin the study the following Monday to prevent change in the program that might have influenced the distribution of time if the study was

TABLE 2

Personnel of Units

| | <i>Greene</i> | | <i>Jasper</i> | | <i>Laclede</i> | |
|------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | <i>Full-time</i> | <i>Part-time</i> | <i>Full-time</i> | <i>Part-time</i> | <i>Full-time</i> | <i>Part-time</i> |
| Medical | 2 | 2 | 1 | 1 | 1 | 0 |
| Nursing | 5 | .. | 4 | .. | 2 | .. |
| Sanitation | 1 | 0 | 1 | 0 | 1 | 0 |
| Clerical | 1 | 0 | 1 | 0 | 1 | 0 |
| Total | 9 | 2 | 7 | 1 | 5 | 0 |

TABLE 3

Time Distribution in Hours for All Personnel and Percentage of Total Time in Service and Travel

| | Administration | | | | Public Health | | | | Medical Care | | | | Total Hours |
|---------|----------------|-------|--------|------|---------------|-------|--------|-------|--------------|-------|--------|------|----------------|
| | Service | | Travel | | Service | | Travel | | Service | | Travel | | |
| | Hours | % | Hours | % | Hours | % | Hours | % | Hours | % | Hours | % | |
| Greene | 36.75 | 4.98 | 0.5 | 0.07 | 474.75 | 64.27 | 122.75 | 16.62 | 95.08 | 12.87 | 8.85 | 1.19 | 738.66 |
| Jasper | 75.16 | 13.00 | 8.75 | 1.50 | 364.25 | 62.60 | 100.18 | 17.20 | 28.02 | 4.80 | 3.33 | 0.90 | 582.22 |
| Laclede | 92.8 | 28.5 | 8.0 | 2.50 | 127.50 | 39.20 | 64.5 | 19.90 | 24.9 | 7.7 | 7.5 | 2.20 | 324.6 |

planned in advance. Each unit made an independent time study and reported the activities during this period. A summary of the time spent in administration, purely public health such as venereal disease, tuberculosis, preschool conferences, etc., and on medical care by all the professional staff revealed a surprisingly small percentage of time going into the medical care program (Table 3).

Medical care required from 4.8 per cent in Jasper County to 12.8 per cent in Greene County exclusive of travel time, while time spent on purely public health activities varied from 39.2 in Laclede County to 64.27 per cent in Greene, exclusive of travel. Since the time of the sanitation officer would necessarily weigh the figure in favor of purely public health, his time was not counted, and the total time spent by the health officer, part-time medical staff, and the nurses on medical care was studied but changed the time distribution relatively little, approximately 2 per cent (Table 4).

Although the time spent on medical care by the whole staff was a relatively small percentage of the total, the question of what was happening to the

health officer himself was considered. But here again the time spent by the administrator in actually giving medical care was comparatively small, being 7.3 per cent in Jasper, 9.1 in Greene and in Laclede 19.46 per cent, exclusive of travel (Table 5). Administrative duties consumed from 16.8 per cent in Laclede to 46 per cent of the health officer's time in Jasper County. Nursing time devoted to medical care is very low, varying from 2 to 8 per cent (Table 6), and this was usually spent in clinics (Tables 5-6).

It would appear that the age of the unit has a definite influence on the distribution of time spent in the three activities. The older the unit the less time spent on administration and the greater the time put into purely public health services and into the medical care. In the younger units relatively more time is spent by all personnel on office routines and less on public health and medical care (Table 3).

The time consumed in total travel would seem to be somewhat influenced by the age of the unit but the difference found between the three units is small. The time spent in travel while rendering medical care consumed only 1 to 2 per

TABLE 4

Percentage of Time Distribution by Medical and Nursing Personnel

| | Administration | | Public Health | | Medical Care | | Total | |
|---------|----------------|--------|---------------|--------|--------------|--------|---------|--------|
| | Service | Travel | Service | Travel | Service | Travel | Service | Travel |
| Greene | 5.6 | 0.08 | 63.75 | 14.6 | 14.60 | 1.37 | 83.95 | 16.05 |
| Jasper | 15.3 | 1.8 | 58.50 | 17.5 | 5.7 | 1.20 | 79.50 | 20.5 |
| Laclede | 26.53 | 1.16 | 42.41 | 17.46 | 9.66 | 2.80 | 78.60 | 21.40 |

cent of the total travel while purely public health travel used 14 to 17 per cent of the total time.

Although the units' activities were being surveyed to find out what and how much the medical care part was taking away from the public health program, a report was requested from each of the units on the regular monthly report form (B-1427) for the study period. A review of the services rendered would seem to indicate that all phases of the health program were touched, and that there was no evidence that any part of the program of general health had been slighted for another, although the study period was very short and the sample may not be considered good.

After seventeen years' experience with an integrated public health and medical care program in one unit and twelve years' experience in another, the results have seemed to warrant the courts being advised to establish new county units on this basis. There are now six of them in full operation in rural areas. This course has been deemed wise in view of the fact that county funds are limited by statutes and by the Constitution, and generally are too small to pay for two local health services. Since the county courts are definitely responsible for providing some medical care program, it becomes essential to establish the integrated program under the administrative direction of the full-time health officer, if health units are to be developed throughout the rural areas. The cost of the combined programs is, of course, more than the cost of the usual type. The three units under study cost an average of \$.92 per capita which is more than usually provided for rural local health

work. However, in general it has been found that the previous cost of medical care alone to the county is sufficient to meet the county's part in maintenance and operation of the combined unit under the direction of the health officer. The budgeted amounts per capita in Greene and Jasper Counties are not a fair evaluation of cost, since venereal disease and tuberculosis are cared for in the total municipal as well as the county population (Table 1).

None of the units conducting the combined program has ever had a staff sufficient in number to render complete and adequate medical care and corrective dental programs. They have, however, delivered good services, superior, it is believed, to the medical services rendered under the administration of a county judge or by a part-time county physician without the guidance of a full-time health officer. The services rendered in all fields of health both preventive and remedial have demonstrated to the community, by actual care of the sick and injured, the importance of the total health service which the purely public health activities, by their very abstractness and intangible nature, could not possibly have done.

It is now felt that in Missouri we have definitely passed through the experimental stage. We believe that a combination of medical care and public health service is practicable, in that a combination unit under the single administrative direction of the health officer offers a unified service satisfactory to the court, and supplies the community with both curative medical care and preventive service which is within the power of the tax payer to support.

Errors in Clinical Statements of Causes of Death

Second Report *

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THIS is the second paper of a series on "Errors in Clinical Statements of Causes of Death." In using the word "error," we do not necessarily mean real or serious diagnostic mistakes such as occur when, for instance, the clinician diagnoses an ulcer of the duodenum which proves at autopsy to be a carcinoma of the stomach, or when the pathologist finds that the aneurysm of the aorta is not due to syphilis, but to arteriosclerotic degeneration.

Besides such incorrect statements we often find others which are only incomplete diagnoses; for instance, if "pneumonia" is stated instead of the precise diagnosis, lobar pneumonia or bronchopneumonia. In this group of partly correct statements belong cases in which the clinician has given only the site or pathologic condition, or both, secondary to the primary disease. This is especially true with metastasis of malignant tumors, and purulent infections.

Both such groups of diagnostic errors, the incorrect and partly correct statements, are of a *clinical nature*. Comparing the clinical diagnosis with the autopsy findings, we are in most cases in position to decide whether the clinical diagnosis was correct, partly correct, incomplete or incorrect. But dealing with the statistics of causes of death, we frequently find differences between clinical and pathologic causes of death as they are to be tabulated according to the *International List of Causes of Death*.

For instance: A case in which the clinician has given the cause of death as "hypertensive arteriosclerotic heart disease" and the pathologist reports: "nephrosclerosis with hypertension and myocardial failure," we decide that the clinical diagnosis is correct because the same condition was meant in both diagnostic statements. The classification of these two statements according to the *International List of Causes of Death*, however, would place the clinical diagnosis under No. 93d (hypertensive heart disease when no involvement of the kidneys is mentioned) and the pathologist's statement under 131a, because the arteriosclerotic kidney is mentioned. Thus, we find the same clinical condition may be tabulated under two

* Based upon 25,066 clinical and post-mortem statements on causes of death. The Tables 1-5 contain only an abstract of 19 diseases, the complete tables refer to every disease listed in the *International List of Causes of Death* with numerous additional subdivisions. The first report appeared in *A.J.P.H.*, 32, 3:251 (Mar.), 1942. The final report, to be finished in 1943, will be based on 40,000 autopsy protocols and clinical histories from 30 different hospitals.

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different rubrics or numbers of the *International List*. In another illustration, we find the opposite situation: when the clinician, without having made an operation or biopsy, diagnoses a carcinoma of the gallbladder and the pathologist finds a sarcoma of the liver with obstruction of the biliary passages, we have a clinical error of site and kind of disease. Tabulation of either statements would, however, be under the name number, 46f (cancer of the liver and biliary passages).

The first example is complicated by the lack of uniformity in clinical diagnoses and terms of the *International* classification and brings both statements "arteriosclerotic heart disease" and "hypertensive cardio-vascular disease" under the same number, 93d (chronic myocarditis without mention of rheumatism), but the clinician means, in most cases, renal involvement when he states the condition to be that of hypertension. Of a similar nature are all cases where the clinician states: "chronic rheumatic cardio-valvular disease" without mentioning especially that the mitral valve is also affected. These cases must be registered under No. 92c (chronic myocarditis, specified as rheumatic). The pathologist gives accurately the same diagnosis, but mentions in his report aortic stenosis and insufficiency, mitral stenosis and insufficiency and many secondary conditions caused by this "chronic rheumatic cardio-valvular disease." The result in tabulation is to list that case under 92b (chronic diseases of the mitral valve). We find later that the bulk of changes in clinical and pathologic assignments to numbers of the *International List* for cardio-valvular and cardio-vascular diseases are due to such lack of uniformity of diagnostic statements.

We have to mention the only further important source of changes in the statistical tabulation caused by different assignment according to primary and

contributory causes of death. We have in this group two possibilities:

(a) cases in which both diseases, which occurred simultaneously, have been diagnosed by either clinical or post-mortem examination, but where the clinician was of other opinion than the pathologist, as to which disease shall be mentioned as primary and which as contributory.

(b) cases in which the disease, mentioned solely by the clinician, was verified by the pathologist, who, however, found an additional or other condition of primary importance. We have, for instance, several cases of benign hypertrophy of the prostate (No. 137a), in which the clinician found beside the benign hypertrophy a carcinoma of the prostate and mentions the malignant tumor in first place as primary cause of death, and reports both conditions as the final causes of death.

It is sometimes extremely difficult to decide whether or not the clinician made a mistake, especially in cases belonging to group (a), and more so when the pathologist says afterward that the clinical opinion is correct also.

The comparison of Errors in Clinical Statements, as they appear in the statistics of causes of death, must therefore consider both types of diagnostic changes of:

- (I) clinical nature
- (II) statistical tabulation

Such a twofold and combined consideration of incorrect, incomplete, partly correct, and correct clinical statements is the subject of this second contribution.

Our first objective is to determine the accuracy of clinical statements with regard to the clinical nature of the diagnosis. Every complete diagnosis consists, or should consist of three statements:

- (1) the cause of the disease
- (2) the organ which is affected
- (3) the manifestation and pathologic changes caused by the disease

Illustration: "ruptured appendicitis" is complete; it gives the organ (appendix), the cause (infection), and the pathologic condition (rupture). "Arte-

riosclerotic cardio-vascular disease" is incomplete; it gives the organ (cardio-vascular system in its entirety), the cause (arteriosclerotic degeneration), but it fails to give the important manifestation which may be that of a coronary sclerosis, nephrosclerosis, cerebral hemorrhage, etc.

In the first report we did not attempt to evaluate the clinical statements regarding the manifestation of diseases, because of the difficulties due to lack of uniformity in diagnostic definitions, especially as far as the pathologic verification of clinical statements is concerned. We have, for instance, to remember that some manifestations of disease, removed by operations, cannot be seen at autopsy. Second: In this paper we intend to compare the results of the statistics of

causes of death with clinical considerations which must be based upon the statistical classification of diseases in which only occasional manifestations are mentioned (such as cholecystitis: with and without mention of cholelithiasis, the arteriosclerotic cardio-vascular and the rheumatic cario-valvular diseases, and the manifestations of tertiary syphilis, etc.)

We have, however, distinguished in each case, between the *site* of disease and the *cause* of disease, and coded each clinical statement according to the degree of its correctness or incorrectness, topographically and etiologically.

The following code was used for diagnostic changes which are numbered from O to Y in twelve different items with corresponding meanings for the topo-

CODES FOR DIAGNOSTIC CHANGES

| | Code | Topographic | Etiologic |
|-----------------------|------|---|---|
| Correct | 0 | (the statement is considered correct also in cases where the body as a whole is affected, or the correct site was not found in either diagnosis) | Correct cause is stated (the statement is considered correct also in cases where in neither diagnosis a specific cause but only a pathologic condition has been given) |
| Incomplete | 1 | Only correct organ system or body system was mentioned | Only correct etiologic or pathologic group was mentioned |
| Partly Correct | 2 | Secondary area involved in extension of disease has been mistaken for primary site | Secondary pathologic condition in extension of disease has been mistaken for primary cause |
| | 3 | Secondary site (metastasis or other secondary lesion) has been mistaken for primary site | Secondary pathologic condition subsequent to primary disease has been mistaken for cause of primary disease |
| | 4 | Site of contributory disease, which is independent of primary disease, has been mistaken for site of primary disease | Specified cause of contributory disease, which is independent from primary disease, has been mistaken for cause of primary disease |
| | 5 | Organ system or body region of secondary site, which is different from organ system or body region of primary site, has been mistaken for primary site. | Etiologic or pathologic group of secondary disease, subsequent to primary disease and different from etiologic or pathologic group of primary disease, has been mistaken for cause of primary disease |
| Unspecified Diagnosis | 6 | Organ system or body region of contributory disease, different from organ system or body region of primary disease, has been mistaken for site of primary disease | Etiologic or pathologic group of contributory disease has been mistaken for etiologic or pathologic group of primary disease |
| | 7 | Incorrect specified site, belonging to the same organ system of correct site and in close topographic relation | Incorrect specified cause or pathologic condition, belonging to the same etiologic group and in close etiologic relation |
| Incorrect | 8 | Other specified incorrect sites | Other specified incorrect causes or pathologic conditions |
| No diagnosis | 9 | Incorrect unspecified site, belonging to another organ system or body region | Incorrect unspecified cause, belonging to another etiologic or pathologic group |
| | X | | Only a symptom or manifestation, not indicating a definite disease (cause) is mentioned |
| | Y | No site of primary disease is given | No cause, pathologic condition or symptom is given |

TABLE 4
Accuracy of Clinical Statements Regarding the Site of Disease

| No. of International List (Rev. 1939) | Causes of Death | The Clinical Statement Regarding the Site of Disease Is | | | | | | | | | |
|---------------------------------------|---|---|----------|------------|-----------------------------|------------|-------|----------|----------------------|----------|------------------|
| | | Correct | | | Partly Correct Referring to | | | | Contributory Disease | | No Site Is Given |
| | | No. | Per cent | Incomplete | Precise | Indistinct | No. | Per cent | No. | Per cent | |
| 1 | 2 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 8 | Scarlet fever | 65 | 89 | .. | .. | .. | 4 | 5 | 4 | 5 | .. |
| 13b | Tuberculosis of the respiratory system | 1,696 | 96 | 9 | 8 | .. | 27 | 2 | 24 | 1 | .. |
| 35 | Measles | 65 | 98 | .. | .. | .. | .. | .. | 1 | 2 | .. |
| 44b | Lymphogranulomatosis | 95 | 88 | 1 | 5 | .. | 1 | 1 | 6 | 6 | .. |
| 46b | Cancer of the stomach | 481 | 87 | 2 | 10 | .. | 5 | 1 | 57 | 10 | .. |
| 46f | Cancer of the liver or biliary passages | 93 | 67 | 1 | 30 | .. | 1 | 1 | 14 | 10 | .. |
| 48a | Cancer of the cervix | 132 | 96 | .. | 4 | .. | .. | .. | 2 | 1 | .. |
| 61 | Diabetes mellitus | 287 | 79 | .. | 2 | .. | 60 | 17 | 2 | 1 | 1 |
| 74a | Leukemias | 269 | 94 | 1 | 1 | .. | 3 | 1 | 11 | 4 | .. |
| 92b | Chronic diseases of the mitral valve | 242 | 89 | 3 | .. | .. | 17 | 6 | 11 | 4 | .. |
| 92c | Chronic rheumatic endocarditis | 279 | 90 | 8 | .. | .. | 13 | 4 | 9 | 3 | .. |
| 93d | Chronic myocarditis, not rheumatic | 574 | 55 | 61 | 137 | 29 | 170 | 16 | 75 | 7 | .. |
| 108 | Lobar pneumonia | 639 | 81 | 6 | 2 | .. | 43 | 5 | 99 | 13 | .. |
| 117a | Ulcer of the stomach | 127 | 73 | 8 | 3 | .. | 8 | 5 | 29 | 17 | .. |
| 121 | Appendicitis | 396 | 94 | 2 | 3 | .. | 4 | 1 | 16 | 4 | .. |
| 122a | Hernia | 156 | 97 | .. | .. | .. | 2 | 1 | 3 | 2 | .. |
| 124b | Cirrhosis of the liver, unspecified | 164 | 84 | 1 | 9 | .. | 11 | 6 | 11 | 6 | .. |
| 131a | Arteriosclerotic kidney | 518 | 88 | 5 | 26 | 2 | 30 | 5 | 10 | 2 | .. |
| 159 | Premature birth | 748 | 85 | 3 | 1 | .. | 115 | 13 | 9 | 1 | .. |
| | Total | 19,265 | 77 | 743 | 1,412 | 106 | 1,371 | 5 | 1,547 | 6 | 632 |

TABLE 5

Accuracy of Clinical Statements Regarding the Cause of Disease

| | | The Clinical Statement Regarding the Cause of Disease Is | | | | | | | | | | | |
|---------------------------------------|---|--|----------|---------------------|---------|----------------------|-----|--------------|-----|--------------|-----|-------------------|-------|
| No. of International List (Rev. 1939) | Cause of Death | Partly Correct Referring to | | | | | | Insufficient | | | | | |
| | | Correct | | Secondary Condition | | Contributory Disease | | Incorrect | | Symptom Only | | No Cause Is Given | |
| | | No. | Per cent | In-complete | Precise | Indistinct | No. | Per cent | No. | Per cent | No. | No. | Given |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 8 | Scarlet fever | 73 | 61 | 84 | .. | .. | .. | 4 | 5 | 8 | 11 | .. | .. |
| 13b | Tuberculosis of the respiratory system | 1,764 | 1,653 | 94 | 2 | .. | .. | 24 | 1 | 84 | 5 | 1 | .. |
| 35 | Measles | 66 | 65 | 98 | .. | .. | .. | .. | .. | 1 | 2 | .. | .. |
| 44b | Lymphogranulomatosis | 108 | 81 | 75 | 1 | .. | .. | 1 | 1 | 25 | 23 | .. | .. |
| 46b | Cancer of the stomach | 555 | 479 | 86 | 14 | .. | .. | 1 | 1 | 61 | 11 | .. | .. |
| 46f | Cancer of the liver or biliary passages | 139 | 117 | 84 | 12 | .. | .. | .. | .. | 10 | 7 | .. | .. |
| 48a | Cancer of the cervix | 138 | 136 | 99 | .. | .. | .. | .. | .. | 2 | 1 | .. | .. |
| 61 | Diabetes mellitus | 352 | 286 | 81 | 1 | 2 | .. | 60 | 17 | 2 | 1 | 1 | .. |
| 74a | Leukemias | 285 | 252 | 88 | 9 | 1 | .. | 3 | 1 | 20 | 7 | .. | .. |
| 92b | Chronic diseases of the mitral valve | 273 | 232 | 85 | 7 | 1 | .. | 16 | 5 | 17 | 6 | .. | .. |
| 92c | Chronic rheumatic endocarditis | 309 | 266 | 86 | 5 | .. | .. | 15 | 5 | 23 | 7 | .. | .. |
| 93d | Chronic myocarditis, not rheumatic | 1,046 | 719 | 69 | 33 | 5 | .. | 171 | 16 | 109 | 10 | 9 | .. |
| 108 | Lobar pneumonia | 789 | 652 | 83 | 16 | 1 | .. | 28 | 4 | 92 | 12 | .. | .. |
| 117a | Ulcer of the stomach | 175 | 144 | 82 | 3 | 1 | .. | 8 | 5 | 18 | 10 | 1 | .. |
| 121 | Appendicitis | 421 | 401 | 95 | .. | .. | .. | 3 | 1 | 17 | 4 | .. | .. |
| 122a | Hernia | 161 | 156 | 97 | .. | .. | .. | 1 | 1 | 4 | 2 | .. | .. |
| 124b | Cirrhosis of the liver, unspecified | 196 | 138 | 70 | 2 | 2 | .. | 16 | 8 | 37 | 19 | 1 | .. |
| 131a | Arteriosclerotic kidney | 591 | 525 | 89 | 5 | 1 | .. | 32 | 5 | 26 | 4 | 2 | .. |
| 159 | Premature birth | 376 | 748 | 85 | 2 | .. | .. | 115 | 13 | 11 | 1 | .. | .. |
| Total | | 25,066 | 19,146 | 76 | 1,007 | 255 | 17 | 1,241 | 5 | 2,437 | 10 | 535 | 428 |

graphic and etiologic part of the diagnosis.

O—means a correct diagnosis, where the pathologic statement is the same as the clinical statement.

1—means incomplete statements, such as pneumonia instead of lobar or bronchopneumonia, or urinary infection, etc.

2—indicates the secondary area (or pathologic condition, etiologically) involved in extension of the disease. These are cases in which the form of the lesion (manifestation) plays its part, and to which a complicating extension of the process, e.g., a carcinoma of the prostate, involving ureters and bladder belongs.

3 and 4—distinguish the secondary and contributory diseases, the former caused by the primary disease and the latter independent of it.

5 and 6—are similar to 3 and 4, respectively; in 5 and 6 the site or cause is not given in precise but rather in unspecified terms, for instance, tumor of the urinary system.

The other items are self-explanatory.

A code number 00 means that the clinical diagnosis was correct, topographically and etiologically; 10 means: incomplete topographic and correct etiologic statement (e.g., the beforementioned example of pneumonia); 01 means: correct topographic, incomplete etiologic statement (e.g., tumor of prostate instead of carcinoma or benign hypertrophy of the prostate); 24 means: secondary site and contributory disease (e.g., a case of carcinoma of the stomach with metastasis in the liver diagnosed as liver cirrhosis when the liver cirrhosis was really present), but a case of carcinoma of the stomach without metastasis in the liver, diagnosed as liver cirrhosis, when cirrhosis of the liver was present, would be coded as 44; 88 means: a disease incorrectly diagnosed both topographically and etiologically.

This large number of different code numbers is summarized in our report according to the group mentioned in the first column: *correct, incomplete, partly correct, incorrect, and no diagnosis.*

We may refer first to *Tables 4 and 5* *

dealing with 19 diseases of interest, according to frequency, statistical consideration and for other reasons. The tables are based upon slightly more than 25,000 cases; the final report will deal with more than 40,000 cases. Our preliminary study includes each disease mentioned in the *International List of Causes of Death*. Since these 5 tables and additional figures referring to a former similar study made upon material from Magdeburg contain 115 pages, we have summarized our results in the material presented here.

Table 4 refers to the accuracy of topographic statements, disregarding the etiologic statements, and *Table 5* to the accuracy of etiologic statements, disregarding the topographic part of the diagnosis. We find 6 per cent of cases with incorrect site of disease, and 10 per cent with incorrect cause of disease. The frequency varies among the diseases considerably, as we see in column 12.

Column 10 indicates the percentage of contributory sites, or causes, taken as primary causes, and column 5 gives the results of the positive part of our study, the correct sites and causes, which are, about equally, slightly more than four-fifths of all cases.

Table 3 combines the accuracy of statements regarding the clinical nature and the comparison of statistical tabulation for the same diseases. We have, at first, divided all cases whether or not the clinical diagnosis was correct, incomplete, partly correct, and incorrect (including with the latter group the cases with no diagnosis given). Under incorrect are included all cases in which either part of the diagnosis was incorrect; i.e., that incorrect site but correct cause, or vice versa, renders the whole

* The tables are numbered according to the sequence of the complete tables contained in Vol. 2, Nos. 4 and 5, of "*Health and Statistics*," published by Kurt Pohlen. A limited number of copies of these tables are available to those interested.

diagnosis incorrect. Similarly, we defined as partly correct all cases in which at least one part of the diagnosis was partly correct, the other part may be better (incomplete or correct) but not incorrect, and so forth.

Then we distinguished in every group of "correct, incomplete, partly correct, or incorrect" diagnosis the individual cases, whether or not the respective number of the *International List* was the same, if tabulation was made on the clinical diagnosis as it would have been had the pathologist's statement been used as basis of tabulation.

In column 6, for instance, 190 cases of chronic rheumatic endocarditis (No. 92c) are mentioned, where the clinical statement "rheumatic chronic cardio-valvular disease" was considered correct, but where the additional findings at autopsy revealed the mitral involvement and called for a different classification under 92b. The same is true with the disease No. 93d, chronic myocarditis, not rheumatic, where beside 278 correct cases there were 265 others, mostly "hypertensive cardio-vascular diseases" for which their international classification was changed due to insufficient definition of the disease.

Table 3 is based upon the clinical diagnosis; all diseases being first sorted according to the *International List* numbers of the clinical statement. Then they were grouped according to the code as correct, incomplete, . . . etc., diagnoses.

We can carry out the same operation in sorting all cases under the *International List* number according to the pathologist's statements and consider how many of them were previously (at clinical examination) correctly, incompletely, etc., diagnosed.

This is done in *Table 2*, which is arranged in the same manner as *Table 3*. We see here again two diseases with large frequencies in column 6, but now No. 92b, chronic diseases of the mitral valve, and 131a, arteriosclerotic kidney,

to which the corresponding cases of chronic rheumatic endocarditis, and chronic myocarditis, beforementioned, were transferred. It is not a mere coincidence that we find in column 6 of *Table 3* (under disease No. 92c), and in column 6 of *Table 2* (under disease No. 92b), exactly the same number of cases.

The final figures for vital statistics, summarizing the experience of *Tables 2 and 3*, are given in *Table 1*, which refers to the classification according to the *International List of Causes of Death* only. Let us take, for illustration, No. 46b, cancer of the stomach. The clinical examination resulted in 555 cases classified under this rubric, of which 456 (col. 6) were verified by autopsy, which means that the pathological classification was the same for them. In 99 cases, however, their allocation in the *International List* was changed, 24 times due to incomplete or partly correct statements and 75 times due to real diagnostic errors.

In addition to the 456 cases of clinically diagnosed and pathologically verified cancer of the stomach, there are 168 cases in which the gastric malignancy was discovered at autopsy only; 90 times among them due to incomplete and partly correct statements, and 78 times due to an incorrect diagnosis. This gives a total of 624 cases, which is 12 per cent higher than the figures compiled according to the clinical examination.

The rate 12 per cent is listed in column 12 as coefficient of correction, which indicates the percentage to which the figures based on clinical statements must be increased or decreased when corrected by the figures based on the pathologist's statements.

In columns 10 and 11, are listed two types of indices of error. If we take again the example of carcinoma of the stomach, we find that this disease (or a disease which has the same *International*

TABLE 3
Accordance of Clinical Statements on Causes of Death With Autopsy Findings—Based Upon the Clinical Diagnosis
The Autopsy Findings Reveal, That the Clinical Statement, as Mentioned in Col. 2, Is

| No. of International List (Rev. 1939) | Causes of Death | Total Deaths | Correct | | | Incomplete | | | Partly Correct | | | Incorrect | | |
|---------------------------------------|---|--------------|-------------------------|--|-----------|--|-----------|--|----------------|--|-----------|-----------|-----------|--|
| | | | Total Correct in Col. 3 | The No. of the International List of Causes of Death, Referring to the Autopsy Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | The No. of the International List of Causes of Death, Referring to the Autopsy Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | The No. of the International List of Causes of Death, Referring to the Autopsy Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | The No. of the International List of Causes of Death, Referring to the Autopsy Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | | | |
| | | | | Same | Different | Same | Different | Same | Different | Same | Different | Same | Different | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | | | |
| 8 | Scarlet fever | 73 | 34 | 61 | .. | .. | .. | .. | 8 | .. | .. | 4 | | |
| 13b | Tuberculosis of the respiratory system | 1,764 | 93 | 1,630 | 13 | .. | 2 | .. | 32 | .. | .. | 87 | | |
| 35 | Measles | 66 | 99 | 65 | .. | .. | .. | .. | .. | .. | .. | 1 | | |
| 44b | Lymphogranulomatosis | 108 | 75 | 81 | .. | .. | 2 | .. | 5 | .. | .. | 22 | | |
| 46b | Cancer of the stomach | 555 | 80 | 442 | .. | 7 | 3 | 7 | 21 | .. | .. | 75 | | |
| 46f | Cancer of the liver or biliary passages | 139 | 63 | 88 | .. | 2 | .. | 8 | 25 | 2 | .. | 14 | | |
| 48a | Cancer of the cervix | 138 | 95 | 131 | .. | .. | .. | .. | 5 | .. | .. | 2 | | |
| 61 | Diabetes mellitus | 352 | 81 | 284 | 2 | .. | 1 | .. | 62 | .. | .. | 3 | | |
| 74a | Leukemias | 285 | 88 | 251 | 1 | 4 | 4 | 2 | 11 | .. | .. | 12 | | |
| 92b | Chronic diseases of the mitral valve | 273 | 83 | 219 | 7 | 3 | 6 | 2 | 25 | 1 | .. | 10 | | |
| 92c | Chronic rheumatic endocarditis | 309 | 85 | 73 | 190 | .. | 7 | 1 | 22 | .. | .. | 16 | | |
| 93d | Chronic myocarditis, not rheumatic | 1,046 | 52 | 278 | 265 | 3 | 45 | 3 | 309 | 1 | .. | 142 | | |
| 108 | Lobar pneumonia | 789 | 75 | 587 | 3 | 1 | 11 | .. | 117 | .. | .. | 70 | | |
| 117a | Ulcer of the stomach | 175 | 65 | 114 | .. | 1 | 10 | .. | 29 | 1 | .. | 20 | | |
| 121 | Appendicitis | 421 | 94 | 396 | .. | .. | 1 | .. | 6 | .. | .. | 18 | | |
| 122a | Hernia | 161 | 97 | 156 | .. | .. | .. | 1 | 1 | .. | .. | 3 | | |
| 124b | Cirrhosis of the liver, unspecified | 196 | 70 | 137 | 1 | 1 | 1 | .. | 21 | .. | .. | 35 | | |
| 131a | Arteriosclerotic kidney | 591 | 85 | 499 | 2 | 2 | .. | 11 | 49 | .. | .. | 28 | | |
| 159 | Premature birth | 876 | 85 | 744 | 3 | .. | 2 | .. | 115 | .. | .. | 12 | | |
| | Total. | 25,066 | 67 | 16,782 | 836 | 161 | 747 | 163 | 2,940 | 46 | .. | 3,391 | | |

number) was mentioned in 723 cases:

- 456 times in both the clinical and pathological statement,
- 99 (24 plus 75) times in the clinical statement only, which was not verified by autopsy, and in
- 168 (90 plus 78) times in the pathologic statements and not previously mentioned as any kind of gastric malignancy in the clinical record.

Among the 723 cases, in which some kind of gastric malignancy was mentioned, we find 456 correct and 267 (99 plus 168) erroneous statements. These 267 erroneous statements are 37 per cent of the total of 723 and this can be considered as the Index of Error.

Based upon our studies on the difference between incomplete, partly correct, and incorrect diagnoses, we may divide the Index of Error into

(a) the error of clinical diagnosis (col. 10) which includes both types of incorrect diagnoses (75 clinical statements not verified post-mortem and 78 post-mortem statements not observed clinically), and expresses the sum as a percentage of the total of all examinations in which cancer of the stomach is mentioned.

(b) the inadequacy of statistical tabulation (col. 11) which combines in the same manner the changes in the *International* classification due to incomplete and partly correct statements.

The variation of the Indices of Error is seen in *Table 1*. We observe the large difference between the infectious diseases (scarlet fever, tuberculosis of the respiratory system, and measles) and the organic heart diseases (endocarditis and myocarditis), but we see also the large factor of partly correct diagnoses among the latter.

These facts cannot be discussed in detail here. We mention briefly, however, the two other groups, representing the data from *Tables 4 and 5* and indicating the accuracy of etiologic and topographic statements, separated from each other.

Statistical studies like these about

which we are reporting cannot be easily compared with other similar studies. This is due to several causes:

(1) Our present material is derived from outstanding hospitals. We might expect to find here relatively low "Indices of Error," but we have seen that the statements of the best clinicians by reason of their exactness and completeness of diagnostic statements differ often in some details from the findings of expert pathologists. The better the pathologic examination, the higher the per cent of error.

(2) A nomenclature of diseases which goes into many details makes more changes in the statistical classification possible than a nomenclature which is less detailed. For instance: the previous *International List* (1929) mentioned chronic nephritis only. Today (1938 list), we have a division into arteriosclerotic kidney and other chronic nephritis. Numerous cases of chronic glomerulonephritis which proved to be arteriosclerotic kidney are, in the present study, considered to be incorrect diagnoses; they did not indicate a change in the statistical tabulation before the last revision of the *International List* took place in 1938.

CONCLUSION

We recognize that we all are inaccurate, partly because we do not have the means to establish and express the truth completely. There are inaccuracies in vital statistics, but we do not think that vital statistics are therefore worthless or should be discarded or unused. On the contrary, by identifying the location and degree of errors, we are in the position to offer valuable aid to the clinician and the pathologist in diagnosis, and we increase the information which statistics can offer by making manifest those errors which so often are used to discredit vital statistics. In this way, the former cause of unreliability becomes a source of genuine information.

The statistics which we have presented herewith and those presented last year would be incomplete if we should not have tabulated the direction of diagnostic changes. Now we know how often a diagnosis has been incorrect, but

TABLE 1
Summary of Clinical-pathologic Statistics of Statements on Causes of Death,
U. S. Hospitals, 1930-1939

| No. of International List (Rev. 1939) | Causes of Death | No. of Deaths According to the Clinical Diagnosis | Correction of Diagnoses * | | | | No. of Deaths According to the Pathologic Diagnosis | Indices of Error Regarding | | | Coefficient of Correction | |
|--|---|---|---|---------------------|---|---|---|--|--|-----------------------|---------------------------|---------------------|
| | | | The Clinical Diagnosis as Mentioned in Col. 2 | | The Diagnosis of Col. 2 Was Found Only by Autopsy | | | Col.: 5+8 3+0-6 100 3+9-6 100 3 | Col.: 4+7 3+9-6 100 3+9-6 100 3 | Col.: 9-3 100 3 | | |
| | | | Was Not Verified by Autopsy | | Was Verified by Autopsy | | | | | | | |
| | | | Incomplete and Partly Correct Statement | Incorrect Statement | Was Verified by Autopsy | Incomplete and Partly Correct Statement | | | | | | Incorrect Statement |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 8 | Scarlet fever | 73 | 8 | 4 | 61 | .. | .. | 61 | 5 | 11 | .. | .. |
| 13b | Tuberculosis of the respiratory system | 1,764 | 47 | 87 | 1,630 | 85 | 86 | 1,801 | 9 | 7 | 86 | 7 |
| 35 | Measles | 66 | .. | 1 | 65 | 3 | .. | 68 | 1 | 4 | .. | .. |
| 44b | Lymphogranulomatosis | 108 | 5 | 22 | 81 | 9 | 18 | 108 | 31 | 10 | 18 | 0 |
| 46b | Cancer of the stomach | 555 | 24 | 75 | 456 | 90 | 78 | 624 | 21 | 16 | 78 | 16 |
| 46f | Cancer of the liver or biliary passages | 139 | 25 | 14 | 100 | 72 | 76 | 248 | 31 | 34 | 76 | 34 |
| 48a | Cancer of the cervix | 138 | 5 | 2 | 131 | 10 | 7 | 148 | 6 | 10 | 7 | 10 |
| 61 | Diabetes mellitus | 352 | 65 | 3 | 284 | 10 | 9 | 303 | 3 | 20 | 9 | 20 |
| 74a | Leukemias | 285 | 16 | 12 | 257 | 12 | 18 | 287 | 10 | 9 | 18 | 9 |
| 92b | Chronic diseases of the mitral valve | 273 | 38 | 10 | 225 | 247 | 60 | 532 | 11 | 68 | 60 | 68 |
| 92c | Chronic rheumatic endocarditis | 309 | 219 | 16 | 74 | 15 | 21 | 110 | 25 | 44 | 21 | 44 |
| 93d | Chronic myocarditis, not rheumatic | 1,046 | 619 | 142 | 285 | 86 | 49 | 420 | 16 | 60 | 49 | 60 |
| 108 | Lobar pneumonia | 789 | 131 | 70 | 588 | 162 | 64 | 814 | 13 | 29 | 64 | 29 |
| 117a | Ulcer of the stomach | 175 | 39 | 20 | 116 | 18 | 43 | 177 | 28 | 24 | 43 | 24 |
| 121 | Appendicitis | 421 | 7 | 18 | 396 | 39 | 28 | 463 | 9 | 9 | 28 | 9 |
| 122a | Hernia | 161 | 1 | 3 | 157 | 1 | 12 | 170 | 9 | 1 | 12 | 9 |
| 124b | Cirrhosis of the liver, unspecified | 196 | 23 | 35 | 138 | 31 | 70 | 230 | 35 | 13 | 70 | 13 |
| 131a | Arteriosclerotic kidney | 591 | 51 | 28 | 512 | 697 | 196 | 1,405 | 15 | 49 | 196 | 49 |
| 159 | Premature birth | 876 | 120 | 12 | 744 | 6 | 8 | 758 | 2 | 14 | 8 | 14 |
| | Total | 25,066 | 4,523 | 3,391 | 17,152 | 4,523 | 3,391 | 25,066 | 29 | 20 | 3,391 | 20 |

* Regarding the No. of the International List of Causes of Death

TABLE 2
*Accordance of Clinical Statements on Causes of Death With Autopsy Findings—Based
 Upon the Post-mortem Diagnosis*
*The Previous Clinical Statement, Regarding the Autopsy
 Cases, as Mentioned in Col. 2, Is*

| No. of International List (Rev. 1939) | Causes of Death | Total Deaths | Correct | | | Incomplete | | | Partly Correct | | | Incorrect | | |
|---------------------------------------|---|--------------|-------------------------|--|-----------|--|-----------|-------------------------|--|-----------|-------------------------|--|-----------|-------------------------|
| | | | Total Correct in Col. 3 | The No. of the International List of Causes of Death, Referring to the Previous Clinical Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | The No. of the International List of Causes of Death, Referring to the Previous Clinical Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | Total Correct in Col. 3 | The No. of the International List of Causes of Death, Referring to the Previous Clinical Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | Total Correct in Col. 3 | The No. of the International List of Causes of Death, Referring to the Previous Clinical Diagnosis, Is Same as or Different from the No. Mentioned in Col. 1 | | Total Correct in Col. 3 |
| | | | | Same | Different | Same | Different | | Same | Different | | Same | Different | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 8 | Scarlet fever | 61 | 100 | 61 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 13b | Tuberculosis of the respiratory system | 1,301 | 91 | 1,630 | 10 | .. | 4 | .. | 71 | .. | 86 | .. | .. | .. |
| 35 | Measles | 68 | 96 | 65 | .. | .. | .. | .. | 3 | .. | .. | .. | .. | .. |
| 44b | Lymphogranulomatosis | 108 | 75 | 81 | .. | .. | 1 | .. | 8 | .. | 18 | .. | .. | .. |
| 46b | Cancer of the stomach | 624 | 69 | 442 | 1 | 7 | 24 | 6 | 65 | 1 | 78 | .. | .. | .. |
| 46f | Cancer of the liver or biliary passages | 248 | 36 | 88 | 1 | 2 | 10 | 8 | 61 | 2 | 76 | .. | .. | .. |
| 48a | Cancer of the cervix | 148 | 89 | 131 | 1 | .. | 2 | .. | 7 | .. | 7 | .. | .. | .. |
| 61 | Diabetes mellitus | 303 | 94 | 284 | 1 | .. | .. | .. | 9 | .. | 9 | .. | .. | .. |
| 74a | Leukemias | 287 | 88 | 251 | 1 | 4 | .. | 2 | 11 | .. | 18 | .. | .. | .. |
| 92b | Chronic diseases of the mitral valve | 532 | 77 | 219 | 190 | 3 | 14 | 2 | 43 | 1 | 60 | .. | .. | .. |
| 92c | Chronic rheumatic endocarditis | 110 | 72 | 73 | 6 | .. | 4 | 1 | 5 | .. | 21 | .. | .. | .. |
| 93d | Chronic myocarditis, not rheumatic | 420 | 75 | 278 | 39 | 3 | 5 | 3 | 42 | 1 | 49 | .. | .. | .. |
| 108 | Lobar pneumonia | 814 | 72 | 587 | 2 | 1 | 35 | .. | 125 | .. | 64 | .. | .. | .. |
| 117a | Ulcer of the stomach | 177 | 64 | 114 | .. | 1 | 3 | 1 | 15 | .. | 43 | .. | .. | .. |
| 121 | Appendicitis | 463 | 86 | 396 | 3 | .. | 1 | .. | 35 | .. | 28 | .. | .. | .. |
| 122a | Hernia | 170 | 90 | 156 | .. | .. | .. | 1 | 1 | .. | 12 | .. | .. | .. |
| 124b | Cirrhosis of the liver, unspecified | 239 | 58 | 137 | 2 | 1 | 1 | .. | 28 | .. | 70 | .. | .. | .. |
| 131a | Arteriosclerotic kidney | 1,405 | 36 | 499 | 299 | 2 | 55 | 11 | 343 | .. | 196 | .. | .. | .. |
| 159 | Premature birth | 758 | 98 | 744 | 1 | .. | .. | .. | 5 | .. | 8 | .. | .. | .. |
| | Total | 25,066 | 70 | 16,782 | 824 | 161 | 756 | 163 | 2,911 | 46 | 3,423 | .. | .. | .. |

we do not know yet which new diagnosis took the place of the one first given. We are, therefore, preparing tables that show each individual change of diagnosis and all combinations of diagnoses with each other.

We are preparing to make the same (or similar) tables as for the clinical and pathologic cause of death, for the comparison between the diagnosis at admission to hospital and at autopsy. Furthermore, we are sorting our records

according to cases with operation, biopsy, electrocardiogram, etc.

Finally, we are preparing tables giving the combination between primary and secondary conditions, on one hand, and the various contributory diseases on the other hand (each separated from the other). These tables based upon autopsy findings, will then include the various secondary conditions and manifestations in order to give a complete picture of the cause of death.

Simplified Procedures in Tuberculosis Control

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EVERY tuberculosis administrator, health officer, and worker in the tuberculosis control field will be faced with greatly increased problems from this time forward until more nearly normal conditions are restored in the world. A large number of physicians, nurses, and other trained personnel are now serving this country in the armed forces, and more will follow in the coming months. At the same time there is evidence to show that since 1938 the rate of decline of the tuberculosis death rate has been definitely slowed. The rise of tuberculosis in Great Britain and other countries directly involved in the war should be a warning to this country, for in a large degree the same problems of reduced standards of living will become operative here as there. This problem of more to be done and less to do it with will demand a more realistic and practical program than has been followed by many in the past.

If the traditional procedures used by many clinics for years in clinic supervision are continued, it can only result in a greatly increased case load per unit of physicians' or nurses' time. Up to a certain point this may be absorbed, but if exceeded the individual handling of the case can only be maintained by longer working hours of the staff, or by the elimination of unproductive routines, thus releasing more professional

time for the really significant case. There can be no debating the point that whatever plan is used, it must be efficient and effective. The physicians who remain will find their other duties increased as well as those in the clinic, so that more time in the clinic will become more and more difficult to provide.

The need for such simplification of procedure has confronted the Bureau of Tuberculosis in New York City for many years, and considerable effort has been given to analyzing the productivity of our procedures. As a result, over the past few years we have made a number of changes which may appear radical to others, but which have in our experience greatly expanded the effectiveness of our staff, with no sacrifice of expert attention for the individual case.

The success of these procedural changes is best illustrated by an analysis of the volume of our work. In an 8 year period, from 1933 to 1941, there has been an increase of 70 per cent in the number of individuals seen in our regular clinics. During the same time the number of clinic visits increased only 26 per cent. It has been in part this saving in visits that has permitted the clinic staff to accommodate the greatly increased case load and still provide more effective service to the individual patient. During the period covered by the fiscal years 1938-1939 to 1940-

1941 the number of physicians' sessions has remained almost constant, despite the fact that there was an increase of 11 per cent in new individuals examined in the regular clinic, and an increase of over 90 per cent in the number of individuals examined in mass surveys.

These simplified procedures have been arrived at through analysis of our clinic activities, special studies of specific problems, and review of the experience of other workers in the field. Most important, they have been based on consideration of the fundamental philosophy underlying clinic tuberculosis control activities. This calls for acceptance of the fact that it is not humanly possible so to supervise all contacts, much less all so-called susceptible individuals in the community, that all lesions will be detected in their incipient stages. Furthermore, it also calls for the realization that medical examination and routine supervision of exposed or susceptible individuals will not of itself prevent the development of a lesion. At best, periodic supervision can only hope to detect a lesion in its earliest phase. We have had occasion to observe that some cases will develop lesions in spite of close supervision, and frequently the lesion that develops is advanced at the time it is first noted. We have seen a moderately advanced lesion appear within a period of 11 days after a negative chest x-ray film.

In our services an effort has been made to develop greater responsibility on the part of the individual patient. This is done by encouraging the physician to spend more time with the patient, instructing him as to his condition, how to take care of it so as to protect himself and others, and as to the need for periodic medical supervision. The importance of reporting promptly at any time symptoms may appear is stressed. This type of education is reinforced by a nurse's conference with patients for whom further instruction

is needed. The use of an appointment system for patients makes it possible for the doctor and nurse to devote adequate time to this activity. It has been our experience that sufficient intelligent effort devoted to the case at the time a lesion is found, or among those that seem to present a special risk due to close and intimate exposure, will accomplish more in prevention and the detection of early lesions than routine requests for revisits of all members of a household irrespective of their importance. The value of this type of educational approach has been fully justified.

The problem of tuberculosis control is essentially the same everywhere; therefore, the principles of the procedure set forth here should be equally valuable and applicable in the rural or urban clinic. We do not believe these problems or the methods of solution presented are indigenous to New York City.

In the first instance we have applied sound business principles of administration to our service. The objectives of the service must be clearly defined before any constructive procedure can be set up. We have therefore defined our objectives: first, to find tuberculosis, and second, to supervise the case found so that he will not be a source of infection to others and, so far as possible, bring his disease to a stage of arrest. A third objective has been to select from the susceptible population those most likely to develop the disease and supervise them during the period of greatest risk.

Having determined our objectives and procedures, we have taken pains to see that every physician on our staff and every nurse in the department has been fully apprised of the underlying philosophy and the why's and wherefore's of every step. This has been accomplished through group conferences and discussions by small groups of the staff

so that each member has been free to enter the discussion. As a result, the entire staff are working unitedly and intelligently toward a common goal.

The major clinic procedures in the Bureau of Tuberculosis can best be discussed in terms of the answers to the following questions:

1. Whom shall we examine?
2. What shall the examination consist of, and how shall we record it?
3. For how long a period, and how often, shall we supervise patients?

WHOM SHALL WE EXAMINE IN THE CLINIC?

Four types of cases are examined in our clinic services—

1. Cases of tuberculosis
2. Associates of cases of tuberculosis
3. Persons with pulmonary symptoms
4. Persons in susceptible groups on the basis of age, sex, race, or economic status

Cases of pulmonary tuberculosis constitute a small but important part of our clinic case load. Active cases must be given periodic supervision while awaiting hospitalization. Certain individuals with productive or partly fibrotic lesions of doubtful stability are suitable for home care and should be observed at frequent intervals in the clinic. A few active cases in need of institutional care, who refuse to enter a hospital, also require clinic supervision. Most cases of this type should be forcibly detained in the hospital if necessary, and every attempt is made so to handle them in our service.

Most of the cases of pulmonary tuberculosis seen in the clinic are arrested, and have come to us after a period of institutional care, or have reached the arrested stage without treatment, or even knowledge of their disease. These cases require careful supervision until complete stability is assured, particularly during the time when normal activity or productive employment is being resumed.

Associates of cases of tuberculosis.

form a large part of the clinic population. These are of two general types, which we designate as possible source cases and contacts.

Possible Source Case: An adult individual in intimate association, in or out of the family, with any of the following types of cases:

- a. Cases of active primary tuberculosis
- b. Closed cases of chronic pulmonary tuberculosis
- c. Cases of tuberculous meningitis
- d. Cases of miliary tuberculosis
- e. Cases of surgical tuberculosis (lymph nodes, bones, skin, abdomen, genitourinary tract, etc.)

Contact: An individual other than a parent, or older relative or associate, who has been in intimate and prolonged or repeated association with an *open case* of chronic pulmonary tuberculosis within the preceding 2 years.

The open case of chronic pulmonary tuberculosis is considered to be one with a positive sputum, or evidence of cavity by x-ray, and therefore presumably infectious. The significance of this distinction will be brought out in connection with the discussion of standards of supervision.

Persons with pulmonary symptoms— The third group of individuals commonly seen in the clinics are those persons seeking examination because of pulmonary symptoms. Many cases of this type are referred by social agencies and welfare organizations, but an increasing number are presenting themselves as a result of the more effective health education of the past few years. Included with this group are those individuals sent to the clinic consultation service by private physicians. The consultation service for private physicians is constantly expanding, and serves a very useful function in making available to the doctor a complete chest examination, including x-ray, by experienced specialists for those patients who would otherwise be unable to

afford such a service. The diagnosis and recommendations for such patients are sent to the referring physician directly.

Persons in susceptible groups—The fourth group, and an increasingly more important one, is composed of persons examined because of the greater likelihood of their developing tuberculosis, and not for any of the reasons cited previously. The increased susceptibility of these individuals is related to their age, racial stock, economic status, character of employment, and similar factors. Our principal approach to this group is through mass x-ray survey examinations, which have been extended to over 600,000 individuals in New York City since 1934.

More recently we have attempted to decentralize much of this work and carry out surveys of selected susceptible groups in the local clinics. While the numbers examined in this manner are smaller per clinic than the mass examinations, they will in the end reach thousands more and utilize to the fullest extent our local x-ray facilities.

WHAT SHALL THE EXAMINATION CONSIST OF AND HOW SHALL WE RECORD IT?

Adequate clinical examination and record keeping are fundamental to any clinic service worthy of the name. This has frequently been taken to mean that a complete history, with detailed information concerning all of the patient's previous illnesses, a general physical examination, tuberculin test, sputum analysis, and radiographic examination must be done on each patient. This we are firmly convinced is neither necessary nor practical. Our main problem is to find tuberculosis. Therefore for the majority of patients a simplified procedure is entirely adequate. We employ the various diagnostic aids according to the following indications:

X-ray examination—All patients receive a posterior-anterior chest roentgenogram at the time of their initial admission to the clinic, and at each periodic supervisory visit. Paper film is used routinely and has proved entirely satisfactory for the initial x-ray and for repeat films on previously negative cases. The cost of 14 x 17" paper x-ray film is a little more than one-third that of corresponding size celluloid films. The latter medium is reserved for rechecking doubtful cases, and in the follow-up of lesions of an unstable character. Special positions are taken only when indicated by the initial film or by fluoroscopy. We feel that the x-ray is the basic method of diagnosis in all cases and has no adequate substitute.

Fluoroscopy—An attempt is made to fluoroscope all new patients and all patients in whom it may provide additional information. We do not substitute it for x-ray, as it does not provide a permanent record and cannot be reviewed.

Tuberculin test—The tuberculin test is used to furnish an index of infection for purposes of supervision and not as a method of selection for x-ray. It is applied to adolescent and young adult contacts who have been removed from the source of infection. Those found negative are not considered contacts and are not followed further. We also use it in infants under 3 years of age on whom it is frequently difficult to secure satisfactory films. Occasionally, the tuberculin test is used as an aid in differential diagnosis. In all the above instances an initial x-ray is taken. Our reasons for not using the tuberculin test as a basis of selection for x-ray are practical and not a lack of confidence in the test. Experience has clearly shown that the application of two tuberculin tests with return on both occasions for reading, followed by x-ray in 20-35 per cent of cases, is not an

economical procedure. Considerable time and effort is spent by doctor and nurse, and both child and parent are frequently disturbed by the repeated use of needles. In many instances the patient fails to complete the tuberculin series or receive the x-ray when the test is positive. The repeated visits required are often a financial burden to the family. All this is obviated by the use of a paper film at small cost, and the detection of non-tuberculous pulmonary conditions is facilitated as well.

Physical examination — It is our opinion that the routine physical examination is not a productive method of diagnosis, and we have eliminated it. Physical examination is employed only when indicated by a history of significant pulmonary symptoms or in cases showing pulmonary lesions by x-ray or fluoroscopy.

History—An elaborate history is not necessary for every patient coming to a tuberculosis clinic. In our service a complete folder type record is made out only for cases with symptoms highly suggestive of pulmonary disease, and for known cases of pulmonary tuberculosis. The records for all other patients are made on 5 by 8" cards. When used for a contact, this card provides complete information concerning the source case and his association with the patient. When used for a case, the card provides a list of common pulmonary symptoms to be checked. Space for x-ray interpretation and notes on revisit is present on the reverse side. This is the only record ever made out for the patient unless a pulmonary lesion is found on the initial or a subsequent film. In such instances the complete folder type record is made out at that time.

Sputum—Sputum examination is performed on all patients with a productive cough, and all specimens are routinely concentrated in our laboratory. The analysis is repeated as often as indi-

cated clinically and is supplemented by gastric analysis and culture when necessary.

Two other short cuts in procedure are employed in our clinics. All x-ray films are interpreted in accordance with a numerical code. This code, which has been published previously,¹ classifies all types of intrathoracic pathology or anatomical variation commonly encountered in a chest roentgenogram by means of a three digit number (e.g., chronic pulmonary tuberculosis, active, minimal—931). The code number does not replace the written description of the x-ray, but does make it unnecessary to rely on a vague or confusing x-ray description. The code is also employed to indicate the diagnosis, and has been adopted in all branches of our service, being used by doctors, nurses, and clerks with facility. The numerical character of the code makes punch card tabulation simple, and detailed analysis can be made through its use that could not be done otherwise.

In an attempt to meet the problem of the increasing demand on our stenographic service, we have introduced a standard form to be used in reporting the results of examination of patients to physicians or agencies. Up to the present such forms have only been used in reporting on cases showing no pathology. This has proved highly successful and we are now planning to employ a mimeographed letter in which the diagnosis and recommendation can be indicated by checking the appropriate box. We recognize that a form letter is not entirely desirable and this is indicated on the letter in the form of a statement explaining the necessity for the use of the form letter because of the present emergency conditions.

FOR HOW LONG A PERIOD, AND HOW
OFTEN SHALL WE SUPERVISE
PATIENTS?

The most important problem facing

any organization engaged in clinic tuberculosis control work is the choice of standards of supervision for patients of various types attending the clinic. There has been a great tendency in the past to avoid meeting this problem through the adoption of a policy best described as "following everybody forever." Such a program is neither sound nor practical. Public health agencies operate on limited budgets and money spent in unproductive activities is always diverted from other more useful fields. Our objective must always be to work in "pay dirt," which means selective clinic supervision and standards based on the relative importance of various groups as sources of case finding. In our service cases are supervised in accordance with the following standards:

Diagnosed cases of tuberculosis—

a. *Active*—An attempt is made immediately to hospitalize all obviously active cases. If this is not possible they are periodically supervised in accordance with their clinical needs. If they are recalcitrant and considered a menace in their households or to the public, steps are taken to detain them forcibly in a hospital.

Cases presenting findings of questionable activity are observed at frequent intervals, monthly if necessary, until a decision as to their status is reached. Their subsequent care will depend on the findings at that time.

b. *Arrested*—Arrested cases are observed at 6 month intervals for 18 months after the diagnosis of arrest is made. If at that time their condition has remained stationary, they are classified as apparently cured and observed as indicated below.

c. *Apparently cured*—Apparently cured cases are observed at yearly intervals. Those lapsing from attendance after 3 years are discharged. There is considerable question in our mind as to the necessity for follow-up of appar-

ently cured cases, and this problem is now being studied.

d. *Pleurisy with effusion (tuberculous)*—If a pleural effusion is present or has been present in the preceding 6 months, such cases are recommended for sanatorium care. Those not institutionalized, or seen for the first time more than 6 months after the acute stage has subsided, are observed at 6 month intervals for a period of 5 years.

Possible source cases—All possible source cases receive an initial examination including chest radiograph. Those found negative are so classified and discharged from further supervision.

Contacts: Contacts are divided into four major groups: Infants (0-3 years of age), children (3-10 years of age), adolescents and young adults (10-25 years of age), adults (30 years of age and over).

a. *Infants*—Infants are tuberculin tested and radiographed on admission. If negative, they are retested every 6 months as long as they remain in contact with the source case. If Mantoux is positive, they are re-x-rayed every 6 months. This procedure is followed until they reach the 3rd year of age. Unless there is evidence of an active tuberculous lesion by the 3rd birthday, all such children are discharged. The parent is instructed to bring the child back if intercurrent respiratory symptoms develop.

b. *Children*—Children examined between 3 and 10 years of age are not tuberculin tested but are routinely x-rayed. If the x-ray shows no evidence of an active tuberculous process the child is discharged.

c. *Adolescents and young adults*—Adolescents and young adults with a history of previous exposure to an open case occurring just prior to, or during adolescence are tuberculin tested. Those failing to react are discharged. If the reaction to the tuberculin test is posi-

tive, or if the contact is still exposed to an open case of tuberculosis, supervision is continued to the age of 25, at 6 month intervals during the first 2 years, and yearly thereafter.

Contacts first seen between the ages of 20 and 25 are followed for 5 years after the last known exposure, at 6 month intervals for 2 years, and yearly for the next 3 years.

Recent evidence would seem to indicate that the maximum period of risk for contacts is during the first 5 years, and particularly during the first 2 years, after the termination of exposure, irrespective of the age of the contact. We are considering confining the supervision of adolescent and young adult contacts to a 5 year period after contact is broken, but examining such patients every 6 months during this period.

d. *Adults*—Our present policy calls for the supervision of adult contacts for a 2 year period after admission to the clinic. They are seen at 6 month intervals during the first year, and again at the end of the 2 year period. If the contact is very intimate supervision may be continued longer.

We have serious doubts as to the significance of exposure in adult life, but recent studies on the frequency of conjugal tuberculosis warrant the adoption of a conservative policy in the handling of adult contacts.

Non-contacts: Persons coming to the clinics for various reasons other than exposure to tuberculosis are routinely x-rayed. If found negative they are discharged.

Filing of records and x-rays—The problem of how to file records and x-rays is one that faces every clinic. The clinician would like to see them preserved indefinitely on all cases. The nurses and clerks working with the records must have them kept so that they can be promptly located, and filed in such a way that counting or analysis

of the file can be readily done. Sooner or later it becomes impossible to meet the wishes of both medical and clerical staff completely. Either the files become so large that too much time is required to locate records, or they become so crowded that they must be cleared for lack of space. It is our feeling that filing can be arranged to serve adequately all the above purposes.

The physician needs the history and x-rays of cases showing pathology for the continued supervision of the patient, or for comparison if the lesion should reactivate at a later date. The negative records are chiefly of interest in the event that the individual returns later with a lesion. The physician is always interested in comparing the films to see if perchance he may have missed the incipient lesion on the first film. Experience has taught us that such comparisons are primarily of academic importance, for, in the final analysis, action must be taken on the basis of the most recent film or physical findings. Consequently we concentrate on preserving records of cases with pathology. Such records are retained in our local clinic stations for 3 years after supervision is discontinued or the patient has lapsed from supervision. The records are then transferred to a central storage unit, abstracted on a 3 x 5" card giving the essential data in regard to diagnosis, sputum, and treatment, indexed and given a number, and the abstract card filed. The x-rays are photographed on 35 mm. microfilm and given the corresponding number and stored in a letter size file. Should the patient subsequently return, the abstract card and an 8 x 10" print of the x-ray made from the microfilm are sent to the local clinic. The photographic copy provides an excellent reproduction of the original film, and the use of 35 mm. microfilm practically eliminates the x-ray storage problem.

For some time the same system was

used for records and x-rays of negative cases not in need of further supervision. We now feel that little is gained by retaining microfilm copies of negative x-ray films, and we have discontinued the practice. An abstract card is made out for such cases, the negative x-ray diagnosis entered on it, and the card filed. The x-ray is then promptly destroyed. Due to the limitations of filing space in our clinics we are now considering abstracting records of cases not in need of supervision immediately on discharge, rather than 3 years later. It is our firm conviction that every clinic, whether large or small, with ample or limited filing space, at some time must clear its case record and x-ray files. If the x-rays to be removed are ever to be referred to again, it is useless to pile them in bundles in a dusty basement or storeroom. Photography on 35 mm. microfilm provides an efficient, relatively inexpensive, permanent method of storage.

Even with rapid clearance of records to central storage, the handling of the records and x-rays remaining in the clinic presents many filing problems. An average sized clinic, seeing 4,000 to 5,000 patients yearly, will accumulate several thousand records within 3 years. If these records are kept in one continuous file, whether indexed alphabetically or numerically, considerable time must be spent in locating, removing and refiling them. The important cases under active supervision will tend to be lost among those no longer attending the clinic, and any counting of the file will be almost impossible. For this reason our case record files are divided. The current file contains the records of cases scheduled to return in 6 months or less. It is small and easily reviewed or counted. The non-current file contains the records of all other cases. Both are arranged alphabetically. A master index or tally file of the names of all patients who have

attended the clinic is kept for ready reference.

X-rays are filed numerically, the patient receiving a new x-ray number each time he is x-rayed. All previous films are brought forward and filed under the most recent number. In this way the films of patients who have not attended the clinic for some time remain in the back of the file, and the current x-rays are all filed together. We start our numbering system over again at number 1 each year to facilitate clearance of the x-ray files on a 3 year basis. We use open steel shelving, extending from floor to ceiling and adjusted to accommodate standard 14 x 17" films in envelopes, for filing x-ray films. The use of a numerical system in which x-rays are constantly brought forward, and open shelves, has made locating, removing and re-filing of films rapid and efficient, and has required a minimum of file space.

Appointment system—An appointment system has been developed in our clinics. It requires some time to accustom the patients to this plan, but in the end it tends to schedule the clinic load at a level that can be reasonably accommodated at each clinic session. This results in more prompt clearance of the individual case, a fact that is deeply appreciated by the patient.

A postal card is sent to all patients, who have been given appointments 6 months or more in advance, a week prior to their due date at the clinic. It is estimated that this reminder is adequate in 50 to 60 per cent to assure the attendance of the case. If the first appointment is not kept, another is made by postal. If there has been no response, the available records are reviewed by the physician. This is where a routine x-ray becomes valuable. The tendency with physicians is to be conservative, and they therefore request return visits for many on general principles; however, if it is found

that coöperation is impossible and the x-ray was negative, many cases can be removed from the file without fear of missing an important case. It must be admitted that 100 per cent coöperation is never possible unless police powers are available.

The *Sanitary Code* of the department makes ample provision for pupils and all personnel in schools and food handlers, as well as others where a serious tuberculosis problem exists. They can be excluded from their work until a satisfactory examination has been made, or in very selected cases they may be forced into a hospital for such examination. This authority is used with great discretion. It is applied to pupils and school personnel, and food handlers refusing to coöperate, almost as a routine; to others on the basis of the seriousness of the problem presented.

SUMMARY

The urgency of the times requires the elimination of every unproductive procedure in the tuberculosis control program if the tuberculosis adminis-

trator and health officer are to meet the increasing demands for clinic service, in the face of decreasing personnel.

The factors under which tuberculosis develops are the same everywhere, and sound procedures that are effective and efficient in one place may be applied in another, be it rural or urban in character.

Tuberculosis administrators must first clearly define their objectives and the procedures necessary for their accomplishment. They must then make certain that all those working with them clearly understand each step in the program. The result will be a coördinated and intelligent approach accomplishing the maximum service with the least expenditure of effort and funds.

These principles have been adopted by the Bureau of Tuberculosis of the Department of Health in New York City with unquestioned success. The major principles involved in our plan have been presented in such a way that it is hoped any clinic handling tuberculosis cases can reap the same benefits in effective and efficient service that we have realized.

Accomplishments in Cereal Fortification*

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PROBABLY no other food and nutrition program has advanced so rapidly as the national movement to fortify cereal foods with vitamins and minerals. Such progress would not have been made without the coöperative efforts of industry, public health workers, and government officials, prefaced by extensive research.

BACKGROUND OF THE FORTIFICATION PROGRAM

The background of enrichment of cereal foods, and the chain of events leading to the establishment of a standard for enriched flour by the Federal Security Agency may be reviewed in the literature.^{1, 2, 3, 4, 5, 6} Cereals, including wheat, corn, oats, rye, and rice, are food items of great importance in the American dietary. Before many of the vitamins had been discovered, animal feeding tests as early as 1919⁷ showed the differences in nutritive value of various portions of the wheat kernel, which we now know were due largely to variations in water-soluble vitamins.

We now have simpler and more direct methods, chemical, microbiological, and fluorometric, for measuring many of the vitamins, which are more rapid and accurate than the time-consuming animal bioassays, and have contributed in

no small measure to the rate of progress in vitamin researches. In fact, without the development of rapid quantitative methods, the determination of the vitamin content of natural foods such as whole grains, and the control of the vitamin content of manufactured foods would not have been possible. Without the fortunate coincidental synthesis and commercial production of certain vitamins required for cereal fortification, the large scale fortification program now under way in the cereal industry could never have been undertaken.

Enriched flour in its present form has resulted from a combination of factors. For more than a generation it has been recognized that whole wheat flour contains growth-promoting factors not present in the same concentration in white or patent flour. With this in mind, whole wheat flour has been advocated for its nutritive value. In spite of many efforts to popularize whole wheat bread because of its vitamin and mineral content or its roughage, it has not met with great favor. For many years the sale of whole wheat flour has represented only 2 or 3 per cent of the total flour sales in the United States.

Some years ago, suggestions of nutritionists and consumer interest in vitamins prompted some millers and bakers to produce specialty flours and breads with enhanced vitamin value to supplement or replace whole wheat bread. The specialty flours have contained

* Presented before the Food and Nutrition Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

different percentages of the wheat kernel and in many cases have been fortified with vitamin preparations and mineral compounds. While breads made with these specialty flours are regarded favorably by some people, because they have more pronounced wheat flavor and higher vitamin content, nevertheless they continue to remain specialty products, with far less consumer acceptance than white bread.

When pure forms or potent concentrates of certain of the vitamins, particularly thiamine and niacin, became commercially available and prices were lowered, it was then possible to produce white flour reinforced with vitamins and minerals.

SETTING A STANDARD FOR FLOUR

This was the situation when the U. S. Food and Drug Administration announced a public hearing on a new standard for flour. At this hearing in September and November, 1940, representatives of flour milling companies and others requested the privilege of including added vitamins and minerals to improve the nutritive value of wheat flour. Sherwood⁸ proposed a definition for a new vitamin-mineral restored flour, suggesting required ingredients (recal-

culated to mg. per lb.) as follows: thiamine 1.9, riboflavin 0.9, iron 18.0, calcium 180. Nicotinic acid was proposed as optional ingredient, a suitable figure to be set later. The amounts were selected so patent flour could be restored to whole grain level and thus a very substantial nutritional contribution could be made to the American dietary. There was debate regarding ingredients and levels, and eventually a definition and standard of identity for enriched flour was promulgated by the Federal Security Agency.⁹

The present standard for enriched flour, and the proposed standard for enriched bread, are shown in Table 1.

The bread standard has not yet become official, but by gentleman's agreement, enriched bread conforms with the vitamin and mineral specifications here shown. During the bread hearing, July and August, 1941, suggestions were made to raise the thiamine, niacin, and iron levels to the figures shown in the third column of Table 1. If these raises are made in the final standard, a corresponding increase in the vitamin and mineral levels in enriched flour will also be required.

The Examiner who conducted the bread hearing has not yet reported his "findings of fact" and made his recommendations in this matter; therefore the specifications listed in the first two columns of Table 1 are now operative, with the exception of riboflavin, the effective date of which has been postponed until April 20, 1943, because of the scarcity of riboflavin.*

PRACTICAL PROBLEMS IN PRODUCTION OF ENRICHED FLOUR

Comparison of the enriched flour standard with average vitamin and iron

| <i>Vitamin and Mineral Specifications for Enriched Flour and Enriched Bread</i> | | | |
|---|---------------------------------------|--|--|
| <i>Minimum Levels</i> | | | |
| <i>Ingredient</i> | <i>Flour Federal Standard</i> | <i>Bread</i> | |
| | | <i>Proposed Federal Standard</i> | <i>Modification Suggested at Bread Hearing</i> |
| | | <i>mg/lb.</i> | <i>mg/lb.</i> |
| <i>Required:</i> | | | |
| Thiamine | 1.66 | 1.0 | 1.1 |
| Riboflavin * | 1.2 | 0.8 | 0.8 |
| Niacin | 6.0 | 4.0 | 10.0 |
| Iron | 6.0 | 4.0 | 8.0 |
| <i>Optional:</i> | | | |
| Calcium | 500 | 333 | 300 |
| Vitamin D | 250 U.S.P. | 160 U.S.P. | 150 U.S.P. |

* Effective date of addition postponed until April 20, 1943.

* AUTHOR'S NOTE: Since this paper was presented, Federal Security Agency again postponed the effective date of riboflavin requirement in flour, and also announced a new hearing to review and modify vitamin and mineral specifications for enriched flour and bread. (See *Federal Register*, Mar. 18, 1943.)

TABLE 2

Comparison of Enriched Flour, Plain Flour and Whole Wheat Flour

| | Mg. per lb. | | |
|------------|-------------------|-------------------|---------------------------------------|
| | Whole Wheat Flour | Plain White Flour | Enriched Flour Minimum Gov't Standard |
| Thiamine | 2.3 | 0.3 | 1.66 |
| Riboflavin | 0.6 | 0.15 | 1.2 |
| Niacin | 26.0 | 3.5 | 6.0 |
| Iron | 20.0 | 3.0 | 6.0 |

values for patent flour and whole wheat is shown in Table 2.

Natural grains vary in content of protein, ash, fat, and carbohydrates, depending upon variety and environment during growth, therefore it is not surprising to find variations in vitamin content. Analyses of many samples of wheat have been made in our laboratories. Using these data and others from published literature, we have calculated that two-thirds of the samples tested range as follows: thiamine 1.9 to 2.8 mg. per lb.; niacin 23.4 to 29.2 mg. per lb.; iron 16.1 to 24.1 mg. per lb.

The vitamins and minerals of wheat are not uniformly distributed throughout the kernel. The outer layers of the kernel and the germ are richer in vitamins and minerals than the inner endosperm. Thiamine is the most unequally distributed. Patent flour, which is comprised almost entirely of endosperm, has about one-seventh the thiamine concentration of whole wheat. Of the total thiamine in the wheat kernel, the endosperm contains about 25 per cent, the germ about 15 per cent, and the outer layers of the kernel about 60 per cent. While these values show how the thiamine exists in the natural grain, they do not give a true picture of the thiamine content of the various products of milling, as the commercial process of milling wheat flour does not permit a sharp separation between the various tissues of the wheat kernel.

The distribution of thiamine in the fractions of wheat milling is shown in Table 3. The distribution of thiamine,

TABLE 3

Thiamine Content of Wheat and Mill Products*

(Averages of samples from several commercial millings)

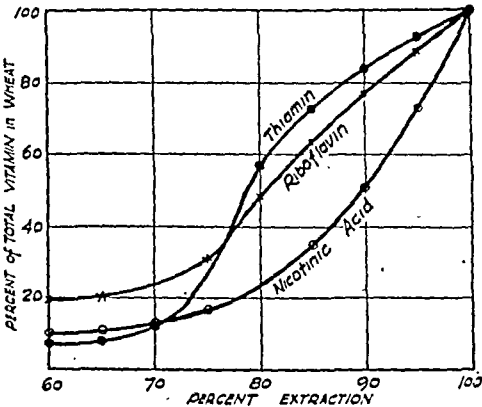
| | Milling Yield Per cent of Cleaned Wheat (approximate) | Thiamine Content | |
|--------------------|---|------------------------|---|
| | | Mg. per lb. Average | Calculated as Per cent of Total Thiamine in Wheat |
| Patent flour | 63.0 | 0.31 | 8.0 |
| First clear flour | 7.0 | 1.36 | 3.9 |
| Second clear flour | 4.5 | 5.61 | 10.0 |
| Red Dog flour | 4.0 | 13.45 | 22.0 |
| Germ | 0.2 | 10.40 | 0.9 |
| Shorts | 12.3 | 7.89 | 39.6 |
| Bran | 9.0 | 4.25 | 15.6 |
| Cleaned wheat | 100.0 | 2.28 | 100.0 |

* Based on data found in references 10 and 11.

niacin, and riboflavin in products of wheat milling differs widely as shown graphically in Figure 1. As the miller lengthens extraction of flour in the range between 70 and 80 per cent, there will be a sharp increase in thiamine, moderate increase in riboflavin, and relatively little increase in niacin.

Enriched flour can be made in two ways—retention, and supplement. The first is accomplished by modifying the flour milling process to produce a long extraction flour, by selecting and blending various mill streams particularly rich in vitamins and minerals. This type of flour will yield bread intermediate in

FIGURE 1



appearance between white and whole wheat bread. Enriched flour made in this manner is apparently poorly accepted by consumers in the United States. The optional ingredients, if used, must be supplemented. Also riboflavin, when later required, must be supplemented, as the mill streams will not provide enough.

The second method requires addition to white flour of thiamine, niacin, and iron. Riboflavin must be added also after April 20, 1943. The vitamins may be used as pure compounds or as vitamin concentrates. At present thiamine and niacin are available in pure form, and probably this form is used exclusively. There are several forms in which iron may be added; most common are ferrum reductum, iron phytate, and sodium iron pyrophosphate. Incorporation of these substances in white flour to make enriched flour is not difficult, but accurate control of mechanical feeders is necessary, and thorough blending of the vitamins and minerals with the flour to form a homogeneous mixture is imperative. Usually this is accomplished by first making a "master mix" containing the vitamins and minerals and a suitable diluent, so that a fraction of 1 per cent of the mix will contribute to the white flour the right amount of vitamins and minerals to yield enriched flour.

Enriched bread can also be made in two ways. It should be obvious that enriched bread will be obtained when enriched flour is used in any bread dough, whether baked in the home or in a commercial bake-shop. The other method is to add a predetermined amount of a vitamin and mineral supplement when mixing the dough. Two kinds of supplements are in common use in bake-shops: (1) concentrated mixtures of the vitamins and minerals either in bulk or in pressed tablets; (2) enriched yeast to which has been added the necessary vitamins and minerals.

Enriched bread, whole wheat bread, and white bread are compared in Table 4.

TABLE 4
Comparison of White Bread, Whole Wheat Bread and Enriched Bread

| | <i>Mg. per lb.</i> | | |
|------------|--------------------------|--------------------|---|
| | <i>Whole Wheat Bread</i> | <i>White Bread</i> | <i>Enriched Bread Proposed Standard</i> |
| Thiamine | 1.34 | 0.35 | 1.0 |
| Riboflavin | 0.82 | 0.6 | 0.8 |
| Niacin | 13.0 | 3.5 | 4.0 |
| Iron | 12.0 | 2.2 | 4.0 |

Above breads made with 6 per cent dry skim milk

Extensive experiments have been made to determine whether baking affects the vitamins. Thiamine is the only heat-labile vitamin in this group. Harrel, et al.,¹² have reported that the average loss of thiamine is 16 per cent under medium baking conditions—30 minutes at 425°. ¹³ Somewhat lighter baking causes only 10 per cent loss. Nearly all the loss occurs in the crust. The crumb does not reach the temperature of the oven, barely exceeding the temperature of boiling water. In later experiments¹⁴ the loss of thiamine in yeast-leavened loaves was found to be independent of the source of the vitamin. Both whole wheat bread and enriched bread show the same loss in baking. No loss of riboflavin was found during normal baking. Niacin is also stable under normal baking conditions. Likewise iron retains its nutritive value in bread. Thiamine loss in bread is small compared with cooking of meat, in which losses range from 0 to 57 per cent when meat is cooked in various ways.¹⁵

In 1939 Taylor¹ favored a program of improvement in nutritive value of foods, and said: "We should first seek retention of the native vitamins, then restoration when advantageous, then fortification when warranted, leaving medication to the last, applicable to regions and groups where ingestion of vitamins as food components encounters exceptional difficulties." He also stressed the importance of separating prevention

from treatment of vitamin deficiency diseases. Enrichment of flour and other cereal products as now practised may be classed as restoration of fortification, and is clearly a preventive measure. The amounts of vitamins and minerals are designed for maintenance, not for treatment of diseases, in accordance with his proposal.

Dr. Taylor further stated, correctly, in April, 1939, that protective restoration with synthetic vitamin B-1 was feasible in milled products from the technical standpoint, but at that time was impracticable on grounds of price. What progress has been made since then! Less than two years later enriched flour with added thiamine, niacin, and iron was being manufactured at the rate of about one million barrels per month; millions of pounds of enriched bread were being made each month by bakers and homemakers; and cereal breakfast foods fortified with vitamins and minerals were being produced in excess of five million pounds per month.

In February, 1941, several of the flour milling companies started producing enriched flour and commercial bakers began making enriched bread according to the formulae proposed by the Food Committee of the National Research Council. Enriched family flour (the type retailed by grocers) and enriched bakers' bread have continuously been supplied to the public since that date. In a short time after enriched flour was placed on the market, 25 to 35 per cent of the family flour was enriched. A year later estimates indicated that at least 50 per cent of the family flour was enriched. The curve is still going upward. It is now estimated that 65 per cent of the family flour is enriched. The government is now buying enriched flour for our armed forces.

In order to induce all millers to enrich all of their mill-controlled brands of family flour, a movement was started

a few months ago by the Millers National Federation to secure pledges from milling companies. The pledge list as of September 16, 1942, included 215 mills.¹⁶ These mills produce more than 65 per cent of the family flour sold in the United States. According to the agreement, when the pledges reach 80 per cent the mills will enrich all of their mill-controlled family flours. A large number of the mills, including those that produce the largest volume of family flour, have been making enriched flours since the program started over a year and a half ago. Manufacturers and blenders of self-rising flours are also endeavoring to get all of their group to sign up in a campaign for enrichment. Further, a survey of several hundred private brands of flour, including the chain stores, has shown that a considerable number of the top brands are already enriched, and others soon will be. In addition a large percentage of the owners of private brands are prepared to enrich their secondary brands.

Because commercial bread production is carried on in thousands of shops and no shop distributes nationally, it is not easy to make an accurate determination of the amount of enriched bread being made. Surveys have been made, however, that indicate that between 70 and 80 per cent of the white bread made by commercial bakers is enriched. It varies in different areas, in some localities as high as 90 per cent is enriched; in others, where public demand has not been great, a small fraction of white bread is enriched.

The production of enriched flour by the miller, and enriched bread by the baker, is not obligatory under federal regulations although it has official sanction of the Federal Security Agency. However, two states, South Carolina and Louisiana, have passed laws requiring enrichment of all flour and bread sold within their borders. Elsewhere the miller may make either enriched

flour or plain flour, or both; the baker has the same choice.* If, however, the miller chooses the enriched type, the number, kind, and amounts of enrichment agents must be in accord with the prescription written by the Federal Security Agency, and labelling must comply with the regulations of the Food and Drug Administration. As always in such situations, federal regulations are enforceable whenever interstate shipments are made.

RESTORATION IN CEREAL FOODS

Restored or fortified cereal breakfast foods have a different legal status from enriched flour, with the exception of enriched farina, which has the same vitamin and mineral specifications as enriched flour. Other types of cereal foods may be restored to whole grain levels or fortified at other levels at the discretion of the manufacturer. Restoration of cereal foods has been encouraged by the National Research Council through its Food and Nutrition Board, and by the Council on Foods of the American Medical Association. The Council on Foods has granted its Seal of Acceptance when manufacturers have applied and conformed with the Council's regulations.†

The Food and Nutrition Board of the

* The Food Distribution Administrator ordered that all bakery white bread must be enriched after January 18, 1943, for the period of the war emergency. (See FDO 1.)

† In August, 1939, the Council on Foods of the American Medical Association stated¹⁷:

"If vitamin B-1 is to be added to foods, those foods which naturally furnish this vitamin but have lost it in processing should be the foods selected for its restoration. The addition of vitamin B-1 to milled cereal products thus appears to be justifiable."

Later¹⁸ the Council on Foods said:

"Should the manufacturer desire to improve the nutritive value of his product" (referring to breakfast foods) "the Council believes that it is proper to do this within reason. The Council has accepted breakfast foods that can be considered as general purpose foods when they have been fortified with moderate amounts of salts of calcium, iron, and thiamine. A value now has been adopted for 'maximum restoration of breakfast cereal foods with riboflavin.'"

National Research Council has adopted several resolutions setting up broad basic objectives for food fortification. Included in these resolutions is a recommendation for appropriate enrichment of flour and bread, and of corn meal. The board recommends that every practicable effort be made to retain all natural nutrients, especially thiamine, niacin, and iron, in the processing of cereals; and further states that when loss in processing is unavoidable their restoration to whole grain levels is desirable.

Thus it is seen that the addition of vitamins and minerals to flour and other cereal foods has received the endorsement of nutritionists who have given serious consideration to the nutritional needs of the American public. The cereal industries are coöperating to improve in vitamin content foods which are already well known for their protein and caloric values and for their palatability.

Problems differ in the restoration of various cereal foods. Those made from refined cereal products will be lower than whole grain in thiamine, riboflavin, niacin, and iron, and therefore require supplement of all these factors. Those made from whole grains rarely need fortification with riboflavin, niacin, and iron, but require addition of thiamine if any of this heat-labile vitamin has been destroyed by processing. In such cases thiamine addition is made at the end of the manufacturing process. The natural content of three cereals is recorded in Table 5.

TABLE 5

Natural Vitamin and Mineral Contents of Cereals

| Constituent | Average Values—Mg. per lb. | | |
|-------------|----------------------------|------------|---------|
| | Whole Wheat | Whole Corn | Oatmeal |
| Thiamine | 2.3 | 2.0 | 3.5 |
| Riboflavin | 0.6 | 0.6 | 0.6 |
| Niacin | 26.0 | 7.0 | 7.0 |
| Iron | 20.0 | 12.0 | 16.0 |
| Calcium | 140.0 | 140.0 | 200.0 |
| Phosphorus | 1,600.0 | 1,400.0 | 1,800.0 |

The fortification of cereal breakfast foods is a common practice now. Many brands, available everywhere, are restored to natural grain levels or supplemented to some extent if vitamins or minerals have been lost in processing. Thiamine, niacin, riboflavin, vitamin D, iron, calcium, and phosphorus are being used as supplements in various cereal products, made with wheat, corn, and oats. It is possible that rice similarly fortified will be produced commercially in the future.

In conclusion I wish to quote from an address by Dr. Robert R. Williams¹⁹ given last winter:

Enriched bread and flour can be brought to everyone in six months if we have the whole-hearted support of every nutritionist, physician and social worker. No one need apologize for advocating something less than perfection. Every good movement has to begin somewhere: let us begin with that feature which promises a major, a universal and a prompt benefit. Success in this will only enhance the power and prestige of the entire nutritional program. Failure in this will embarrass and largely sterilize the rest, for we cannot pretend that these long term objectives are essential for this time of national crisis. If enrichment fails now (and I must remind you that it has not yet succeeded here or elsewhere), it cannot be revived within our lifetime. The industries, once disillusioned, cannot be persuaded to take up the torch again.

In the months since Dr. Williams spoke in this manner there has been substantial increase in the quantity of enriched flour and enriched bread supplied to the American public. His goal, however, has not yet been attained. Greater public demand for enriched flour, enriched bread, and restored cereal foods seems necessary to convince all millers, bakers, and cereal manufac-

turers that all flour, bread, and cereals offered for retail sale should be enriched.

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Association of Other Malignant Tumors with Cancer of the Skin

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IN spite of great interest in the immunological aspects of cancer, there are no satisfactory biologic or chemical tests of cancer susceptibility or cancer immunity that may be applied to human beings. For that reason the approach to the problem must be considered from the statistical standpoint. While considerable data have been accumulated in this field, there is need for still further information.

Workers in the field of public health are particularly well situated to obtain these necessary statistical data. At the present time there are some divergent viewpoints as to the rôle of susceptibility and immunity in human cancer. It has been generally accepted by surgeons, radiologists, and others dealing with the care of cancer patients that immunity does not exist, but there is a probability that some individuals are more susceptible to the disease than others. The behavior of recurrences and metastases of malignant tumors in human beings would lead one to feel that there is no specific immunity developed by the existence or eradication of a primary growth. Since we have no way of knowing what portion of the population is susceptible to the initial development of a tumor, it is difficult to obtain valid information as to whether certain individuals are more or less susceptible to the development of tumor than are others.

The observations of Warren and Gates^{1,2} suggest that there exists an individual susceptibility to the development of a second malignant tumor in those persons who have already developed one such tumor. A contrasting hypothesis of great interest has been developed by Peller, namely, that "A cured tumor leaves protection of the body against the development of other malignant neoplasms." He has collected a considerable mass of statistical data to support this hypothesis, but its validity hinges in part on the assumption that a relatively small proportion (one-fifth) of the total population is actually susceptible to the development of malignant tumors, and in part on the assumption that case records of cancer patients in hospitals have complete histories regarding previous cancers. If these assumptions can be thoroughly established, much weight should be given to Peller's suggestion that existence of such protection might make it advisable to induce easily cured cancer to protect against those cancers developing in sites where cure is difficult or even impossible.

Peller³ recently discussed the findings obtained from 5,876 cancer records collected from several different sources. These records were studied for notations of previous cancers. Among these records 40 were found which noted the existence of previous cancers. It was estimated that one-half of these might

have been synchronous. Peller estimated the number of former cancer histories he would expect to find among these 5,876 cancer records, using as a base the age-sex specific death rates for cancer in Vienna in 1933 and 1934.

He based his estimates on three postulates. "First, a cured malignant disease is not followed by an increased resistance of the body against the development of a second primary tumor. Second, of all carriers of a surface malignancy only 66.6 per cent survive; of all women suffering from breast or genital cancer only 20.0 per cent were cured; of all other cancer patients only 2.0 per cent do not succumb to this disease." Third, "under usual circumstances, for more than four-fifths of all persons over 40 years old the cancer risk is practically zero. Under these normal circumstances they are not susceptible."

Since from his calculations he obtained an expected figure of 225.6 cases, which exceeded the observed 40 cases, Peller believed that he had established his hypothesis that "A cured tumor leaves protection of the body against the development of other malignant neoplasms."

An opportunity to check the findings of Warren and Gates by other data derived from Massachusetts has presented itself in the series of cancer cases studied in state-aided cancer clinics of the Commonwealth (Series A). This material is particularly valuable in that the patients have been kept under observation for considerable periods of time and the development of tumors among this carefully followed population has been determined with a high degree of accuracy. Here, then, is an ideal means of checking the frequency of the development of tumor among those individuals who have had a previous cancer, either superficial or internal. Whether or not patients who have had a skin cancer are actually cured of their cancer of the skin is difficult to say, inasmuch

as the studies on cutaneous cancer^{4,5,6} have shown that these lesions are not nearly so easily cured as is commonly assumed and that recurrence, sometimes early and at times very late, or even metastasis, may occur. While the immediate hazard to life of cutaneous cancer is not great, the morbidity rate is very high.

The Massachusetts Cancer Program has been in operation for slightly over 15 years. The follow-up of the patients seen in the state-aided cancer clinics has been excellent, with a lost case record of about 2 per cent. Series A, Tables 1 and 2, comprise an analysis of 1,990 clinic admissions for cancer between 1927 and 1930. The earlier cases have been followed for 13 years and the later cases for 10 years. In this series of cases, therefore, we have the advantage of long and careful medical observation. In this group of patients 5.9 per cent developed a second cancer. The incidence per person per year of observation was 1,195 per 100,000. An expected number of cases to compare with the 117 observed second malignancies was computed. The incidence rate per person-year was assumed to be the death rate plus the cure rate. The percentage of cures was established to lie between 15 and 22 per cent of all cases, and the deaths between 78 and 85 per cent of all cases. When the maximum and minimum incidence rates were applied to the person-years, the expected number of metachronous cancers lies between 80.4 and 85.6. The difference between the observed 117 and an expected situated between 80 and 86 is significant and would suggest a greater susceptibility to an additional cancer among individuals having had one cancer.

In order to obtain data more nearly comparable to those of Peller, we have chosen two other series of cases (Series B and C, Table 1). Series B comprises those cases over the age of 50 admitted

TABLE 1

| | <i>Observed Metachronous Multiple Cancer</i> | <i>Expected Metachronous Multiple Cancer</i> |
|--|--|--|
| Peller (based on Vienna death rates and 20 per cent susceptibility) | 40.00 | 225.65 |
| <i>Series A</i> | | |
| Massachusetts Cancer Clinics 1927-1930— Showing extent of subsequent cancers through 1940, and computing the expected incidence on the basis of death rate plus cure rate. The cures were estimated as of Massachusetts—18 per cent; death rate Massachusetts 1936 | 117.00 | probable limits 80.4-85.6 |
| <i>Series B</i> | | |
| Massachusetts Cancer Clinics 1939—repeating Peller's method (Vienna death rates and 20 per cent susceptibility) | 19.00 | 74.33 |
| <i>Series C</i> | | |
| Palmer Memorial Hospital—repeating Peller's method (Vienna death rates and 20 per cent susceptibility) | 4.00 | 8.99 |

TABLE 2

| | <i>Number of Admissions for Cancer, 1927-1930</i> | <i>Number Lost</i> | <i>Dead With the Cancer for Which They Were First Ad- mitted to Clinic</i> | <i>Dead Without Cancer</i> | <i>Dead Without Cancer But Had a Second Cancer Prior to Death</i> | <i>Dead Unknown Regarding Cancer</i> | <i>Multiple Cancers at Clinic Admission</i> | <i>Dead With Independent New Cancer</i> | <i>Living Having Had a Second Cancer</i> | <i>Living, No Record of a Second Cancer</i> | <i>Observed Total New Cancers Omitting Multiple Cancers at First Admission</i> | <i>Expected New Cancers Omit- ting Multiple Cancers at First Admission</i> |
|--------|---|--------------------|--|----------------------------|---|--|---|---|--|---|--|--|
| Skin | 668 | 51* | 98 | 197 | 6 | 9 | 21 | 51 | 30 | 216 | 89 | 49.75 |
| Others | 1,322 | 43 | 922 | 105 | 4 | 14 | 7 | 17 | 5 | 212 | 28 | 31.04 |
| Total | 1,990 | 94 | 1,020 | 302 | 10 | 23 | 28 | 68 | 35 | 428 | 117 | 80.79 |

* Two of these had a second cancer before they were lost.

to the state cancer clinics in 1939. In this series records were scanned for previous admissions to the clinic for other tumors, and the mathematical computations used by Peller were repeated on these data. In order to provide a check on these cases from the clinics, a group of 200 consecutive cases of cancer admitted to the Palmer Memorial unit of the New England Deaconess Hospital was studied to determine whether the past history referred to previous occurrence of a malignant tumor in a given individual.

It must be kept in mind in evaluating a series such as this that, although the

staff at the hospital has been particularly interested in making adequate records and the histories are as complete as it is possible to make them under practical conditions, not a few cases of cured cancer will be missed. Many elderly patients have faulty memories; others forget that a tumor, to them of minor importance, such as a small skin cancer, may have been destroyed; still others may not have been told by their physicians that they have had a cancer. Consequently, as would be expected, our Series B and C show considerably fewer observed cases than does Series A. Series B and C are not directly com-

parable with Series A, because Series A is an actual study of the subsequent fate of a case which has been treated for a cancer, and Series B and C are retrospective studies, necessarily much less accurate, of patients now presenting themselves with a cancer.

However, since Peller's data were based on a retrospective study, we felt it was only fair to include in our material data comparable with his.

Peller believes that only one-fifth of the population is susceptible to cancer and in calculating his expected rates he has used this fraction of the population rather than the total. This figure seems to be based on little more than speculation, since it is based on death rates with an increment added for cured cases, and since he postulates that all susceptible individuals develop cancer. While this may be true, it is at variance with the generally held belief that absence of exciting cause may prevent the development of cancer in a susceptible individual. Until more information is available, it seems useless to estimate the proportion of susceptible individuals in the population.

Table 1 shows the relationship between observed and expected of the four series. The expected of Series B, 74.33, is based on Vienna rates and the assumption that 20 per cent of the population are susceptible to cancer. If 100 per cent susceptibility is assumed, the expected would be reduced to 14.9 with Vienna rates and 7.2 with Massachusetts rates. If Massachusetts rates are used, and an assumed susceptibility of 40 per cent, the observed and expected of Series B would be practically identical. Thus the difference between observed and expected can be made negligible by altering the percentage of susceptibles.

The expected in Series A does not depend on assuming a susceptible part of the population as has had to be done

in the other three series, since we are dealing with a cancer population. The observed numbers of second cancers significantly differ from the expected, calculated from the death rate plus a cure rate.

Peller concluded that "A cured tumor leaves protection of the body against the development of other malignant neoplasms. This remnant protection, though not unfailing, is strong enough to justify endeavors to change the distribution of cancers by site." This conclusion is not confirmed by our data. A careful follow-up of cancer patients reveals a larger number of second cancers than a retrospective study which seeks evidence of multiple malignancy from preceding history. The expected rates computed by Peller are misleading, inasmuch as Vienna death rates, 1933-1934, were used rather than the experience in this country at the period at which risk was present, and an assumed susceptibility of 20 per cent was postulated.

CONCLUSION

There is a greater susceptibility to cancer in persons having one cancer than in the normal population. Whether this susceptibility is caused by the first cancer or is inherent in the individual is not known. There is no evidence to assume that the presence of a skin cancer inhibits other cancers. If anything, the evidence points to the contrary.

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Four Years' Use of the Kahn Presumptive Test as a Screening Agency in the Serology of Syphilis*

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EFFORTS of the U. S. Public Health Service in recent years toward control and eradication of venereal diseases has resulted in a considerable increase in the number of specimens of blood submitted to laboratories of state health departments for the serologic tests for syphilis. In order to examine expeditiously this continuously increasing volume, it has become necessary for some of these laboratories to seek out and employ a supersensitive test as a screening agency for negative reacting specimens. These specimens represent about 80 per cent of the load even in those

laboratory. We have been employing the Standard Kahn test for several years.

The purpose of this paper is to give the results obtained in a four year use of the Kahn Presumptive test as a screening agency in the serodiagnosis of syphilis in the laboratories of the Georgia Department of Public Health. Although this test was not devised by its author primarily for this purpose, it has proved to be an efficient means of conserving the time of both the technicians and those whose duty it is to cleanse and prepare the glassware for re-use.

TABLE 1

Routine Application of the Presumptive and Standard Kahn Tests, 1938-1941

| Laboratory | Specimens | Presumptive Test Per cent | | Standard Test Per cent | |
|-----------------|-----------|------------------------------|----------------------|---------------------------|----------|
| | | Negative | Positive or Doubtful | Positive or Doubtful | Negative |
| Central | 664,459 | 72.5 | 27.5 | 18.1 | 9.4 |
| Albany Branch | 80,223 | 66.2 | 33.8 | 21.7 | 12.1 |
| Waycross Branch | 101,824 | 64.3 | 35.7 | 21.5 | 14.2 |
| Total | 846,506 | 70.9 | 29.1 | 18.8 | 10.3 |

states where the incidence of syphilitic infection is the highest.

Some serologic diagnostic procedures employ serum and antigen in more than one proportion. The selection of the procedure is a matter of choice with the

Table 1 gives the number of specimens examined in our laboratory system during the years 1938-1941 inclusive, with the results obtained by the Presumptive and Standard Kahn tests. It is to be noted that of 846,506 specimens examined by the three laboratories, 70.9 per cent were reported negative by the application of an easily performed one tube procedure. It is be-

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

TABLE 2

Specimens Giving Negative Reactions by the Presumptive and Positive or Doubtful Reactions by the Standard Kahn Test, 1938-1941

| Laboratory | Presumptive Test Negative | Standard Test | |
|-----------------|------------------------------|---------------|----------------------|
| | | Negative | Positive or Doubtful |
| Central | 15,688 | 15,677 | 11 |
| Waycross Branch | 1,798 | 1,797 | 1 |
| Total | 17,486 | 17,474 | 12 |

lieved that the larger proportion of the survey type of specimen examined in the Central laboratory, and the differences in the incidence of syphilitic infection in the areas served, are responsible for the percentage variation reported negative by the Presumptive test in the three laboratories.

The percentage of positive reactions reported by the Standard test in these laboratories month after month stands in this same seemingly fixed order as presented in this table.

A variation bearing on the practical application of the screen test in different laboratories is shown in the percentage of specimens failing to confirm by the diagnostic procedure. The two branch laboratories, especially the Albany laboratory, serve sections where malaria is much more prevalent than elsewhere. In our studies¹ on non-syphilitic patients infected with malaria, it was observed that the Presumptive more frequently gave positive reactions than the Standard Kahn test.

A large percentage of specimens examined at the Waycross laboratory come from counties where the U. S. Public Health Service has conducted for the past several years a traveling clinic administering treatment to a large portion of the colored population. It is readily conceived that specimens from these intensively treated cases may more often than usual yield positive reactions by the Presumptive, and negative reactions by the Standard test.

For the purpose of developing speed in performance, trainees in the Central laboratory, after acquiring the necessary skill, perform the Standard test on some of the sera found negative by the Presumptive test. If they find a positive reaction on any of these sera, then both tests are repeated by a more experienced technician for confirmation.

The Waycross laboratory was requested by the U. S. Public Health Service to perform for a period of time both tests on all specimens submitted from counties in which an intensive case finding and treatment program was being instituted.

It will be observed, in Table 2, that of the 17,486 specimens examined by both tests, only 12, or 0.07 per cent, gave positive or doubtful reactions by the Standard test, and negative reactions by the Presumptive test. Nine of these 12 specimens gave definitely atypical positive reactions by the Standard test, which is to be expected. Three of them gave typical minor reactions which cannot be explained, unless occasioned by a rare low titer zone phenomenon. One of the atypically reacting sera had to be diluted 8 times before a positive reaction was obtained by the Presumptive test.

Usually the atypically reacting sera will give sufficient reaction in the Presumptive test to be detected, thus enabling one to withdraw the specimen for examination by the Standard test. The number of specimens which would yield positive or doubtful reactions by

the Standard test, if applied, but which escape detection by the Presumptive test, is negligible.

The question might well arise as to the quality of work done in these laboratories. Table 3 presents the composite

intra-state evaluation studies in this same 4 year period. It will be observed that the sensitivity ratings of the Presumptive Kahn test in the three laboratories are in very close agreement. The specificity ratings are in conformity to

TABLE 3

Average Ratings of Sensitivity and Specificity in National Serology Evaluation Studies, 1938-1941

| Laboratory | Presumptive Kahn Test | | Standard Kahn Test | |
|--------------------|-----------------------|-------------|--------------------|-------------|
| | Sensitivity | Specificity | Sensitivity | Specificity |
| Control Laboratory | 83.9 | 99.9 | 74.5 | 100.0 |
| Central Laboratory | 83.8 | 98.5 | 76.4 | 100.0 |

comparative ratings of the Control laboratory and the Central laboratory in the National Syphilis Serology evaluation studies during the period of time covered in this study. It is observed that the spread in sensitivity between the Presumptive and Standard tests is 9.4 per cent in the Control laboratory and 7.4 per cent in our Central laboratory. A greater spread, of 10.3 per cent, in

the screening efficiency portrayed in Table 1, although these specimens were collected in an area served routinely by the Central laboratory. The ratings for the Standard test lie well within the limit for acceptable performance. It is to be noted that all specimens in Tables 3 and 4 giving nonspecific reactions by the Presumptive test gave negative reactions by the Standard test.

TABLE 4

Average Ratings of Sensitivity and Specificity in Intra-State Evaluation Studies, 1938-1941

| Laboratory | Presumptive Kahn Test | | Standard Kahn Test | |
|-----------------|-----------------------|-------------|--------------------|-------------|
| | Sensitivity | Specificity | Sensitivity | Specificity |
| Central | 91.4 | 99.5 | 84.9 | 100.0 |
| Albany Branch | 91.6 | 98.1 | 81.3 | 100.0 |
| Waycross Branch | 91.2 | 97.1 | 84.5 | 100.0 |

the sensitivity of these two tests, as revealed in Table 1, is to be expected.

General biologic and pathologic conditions, which may give positive reactions in the Presumptive test, are more frequently encountered in the rank and file of specimens received by public health laboratories than in those specimens originating solely from syphilitic clinics.

Table 4 gives the average ratings of sensitivity and specificity of the Presumptive and Standard Kahn tests in

SUMMARY AND CONCLUSIONS

The Kahn Presumptive test has been utilized for 4 years as a screening agency and has proved to be an efficient test for this purpose. The Standard Kahn test is employed as the serodiagnostic procedure.

Tables are presented giving the results obtained on 846,506 specimens, showing that 70.9 per cent were reported negative by the application of an easily performed one tube procedure.

Sensitivity and specificity ratings on

both tests in national and intra-state evaluation studies are given.

Less than 0.1 per cent of 17,486 specimens examined by both tests gave negative reactions by the Presumptive test and positive or doubtful reactions by the Standard test.

The chief value in the employment of the Kahn Presumptive test as a screening agency lies in the conservation of time and work. For example, the application of the Standard Kahn test to 1,000 specimens would require servicing and reading 3,000 tubes by the technicians, and cleansing by the dieners, whereas, by using the described setup, this number has been cut to less than

2,000 tubes. Likewise, reagents are conserved.

The employment of a supersensitive test as a screening agency would be even more practical in laboratories where the percentage of positive reactions with recognized diagnostic procedures is comparatively low. It would, at the same time, provide a desirable means of daily checking one procedure against another in a sufficiently large number of specimens.

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Postgraduate Education of Physicians for Industrial Health Service*

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MUCH of our present-day thinking about educating physicians for industrial health service must perforce be related to the urgent conditions associated with the war. In this connection, the Directing Board of the Procurement and Assignment Service for Physicians has approved two very significant recommendations of its advisory Committee on Industrial Health and Medicine. The first of these defines the essential industrial physician, and attempts to stabilize the existing supply of qualified industrial physicians. The second recommends among other things the creation by the Council on Industrial Health of the American Medical Association of training centers for industrial medical volunteers, using the combined resources of medical schools, bureaus of industrial hygiene, and industrial medical departments.

Under this plan private industry engaged in war production will be notified by all available means that, if they are unable to satisfy a need for the services of a physician locally, they should communicate their requirements to the state chairman of Procurement and Assignment. The request will be reviewed jointly with the Chairman of the Committee on Industrial Health in the State Medical Association and the Director of

the State Industrial Hygiene Service to determine:

1. The industry's need for a physician
2. The nearest available competent replacement

If no competent replacement is available it is contemplated in this program that centers for rapid intensive indoctrination will be provided for eligible physicians. Since Procurement and Assignment agencies, both national and state, are prepared to coöperate, two steps must be taken promptly:

1. Instruction of the committees on industrial health in the state medical associations about the functions they will be called upon to assume under this program.
2. Set about developing centers for intensive training.

FUNCTIONS OF THE COUNCIL ON INDUSTRIAL HEALTH

The Council on Industrial Health has been requested to promote the establishment of training centers, using the facilities of medical schools, bureaus of industrial hygiene, and industrial medical departments.

To meet the peculiar requirements of the present situation, considerable flexibility in the organization of the teaching program is desirable.

1. To permit small groups to be trained at a time, or perhaps even single individuals.
2. To permit entrance into training at almost any time.

The type of organization suggested

* Presented before the Industrial Hygiene Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

by Professor Wampler at the Medical College of Virginia most nearly fits these requirements. At that school co-operation has already been arranged with the Bureau of Industrial Hygiene of the State Health Department, the Industrial Commission of Virginia, the State Department of Education, and the medical departments of industries in and near Richmond, to provide practical instruction in industrial health administration, industrial hygiene and toxicology, and industrial medicine and surgery. The latter segment of training will be supplied by individual case study in the University Hospital and out-patient clinics.

Although there are no very sound figures on which to base an estimate, it would seem that individual scholarships of \$250 to \$300 for 3 weeks of training, available to 250 eligible physicians, would amply meet the intensified requirements of war production industry at the present moment.

CONTINUATION STUDY

Meanwhile, plans are going forward to intensify instruction of the introductory or refresher type which will serve to acquaint the profession at large with the essentials of industrial health service. Under this heading we need to consider the requirements of two major groups:

1. Doctors in general practice who must be depended upon to supply improved service if there ever is to be substantial extension of preventive medicine into industry. The details of instruction are reasonably clear—they are to be found in the outline for the "Teaching of Industrial Health"¹—with such modifications as experience and local situations dictate. It is essential, particularly at this time, to bring the instruction to the doctor where he lives and to adjust it to the industrial health problems of his own locality. His time and efforts are too precious at the moment to expend on fruitless study or investigation.

The other group in community service is:

2. The men in specialty practice—the dermatologists, traumatic surgeons, oculists, radiologists, etc., all of whom increasingly are being called upon to apply their special knowledge and equipment to health problems in industry. To facilitate and improve their acquaintance with the relationship between health and work, committees are being set up in each of the special sections of the Scientific Assembly of the American Medical Association, and these committees in turn are urged to establish working agreements with similar committees in the independent specialty societies. In the list of recommendations filed with these committees, education in industrial affairs as a component of training for certification is incorporated. In addition, they are expected to act as clearinghouses of special information for all classifications of physicians.

EXTENDED STUDY

If again we take the long view of our educational problems as opposed to emergency requirements, it seems beyond argument that, if industrial practice is to take on the full attributes of a specialty in itself, we must lay plans for extended graduate study.

My own impression of a fellowship is an appointment in a university or a foundation, of relatively long but undefined tenure, which carries with it certain obligations in respect to teaching and investigation and which is likely to have a restricted rather than broad interest in the field of medical practice. Certainly such appointments are desirable in every sense, but if our definition is correct, fellowships should be associated with or arise out of separately organized industrial health teaching divisions in properly equipped and located medical, public health, or postgraduate schools. We need to capture the interest of influential people in this direction, since I believe that organization of this character would have the effect of vitalizing the whole medical educational approach to industrial health, all the way up from the undergraduate level. With good support it could be done.

However, it has occurred to us that

we should take a leaf out of the book of experience developed by the certifying boards in other clinical specialties by establishing a system of residency appointments as a means of producing a pool of qualified physicians trained in all aspects of industrial practice and with reasonable speed. Appointments would be based on—

A. Proper preliminary qualifications

1. Graduation from a Class A medical school
2. Approved internship
3. Preferably preliminary general or military practice

For residents, then I can visualize some such service as this:

- A. Six months' training in industrial hygiene and toxicology in a university or public health laboratory of industrial hygiene.
- B. Six months' service in the wards and outpatient departments of an approved hospital able to provide suitable clinical material.
- C. Six to 12 months' service in an approved industrial medical department.

With such a background a candidate ought to be able to present himself before a certifying board with excellent prospects for qualifying and, more important, he should be able to undertake the organization and administration of an industrial medical service to the credit of himself and the profession at large.

HEALTH OFFICERS

The problem of training industrial hygienists of the medical variety, or at least of establishing desirable qualifications, has been considered by the Committee on Professional Education of the American Public Health Association. However, we are greatly interested in the professional equipment possessed by local health officers concerning details of industrial health administration. The Council on Industrial Health has established committees in all but a very few of the state medical associations and is now actively pushing similar committee

organization in all important industrial counties. You will not be interested in too much detail, but our recommendations in respect to the specific industrial health activities of such county committees are briefly as follows:

1. The organization of the committee—The personnel of the committee should contain representation from private practice, industrial practice, and the established public health services. These are the three main professional channels through which service is supplied to industry. Each has much to contribute, and none can perform the entire job alone.
2. Objectives of the committee—The committee should understand the components of adequate industrial health service and be prepared to adjust them to existing local medical and public health facilities and to patterns of community medical practice. In this connection, under ideal circumstances, each war production plant regardless of size should have access to:
 - a. A physician who takes genuine interest in a properly conducted industrial medical department and who is willing to devote regular time to service inside the plant. He may function as an individual in one or more plants, or as a member of a group, or as a member in a panel conducted under the auspices of a state or county medical society.
 - b. Good industrial nursing. Industrial nurses with proper preparation, acting under the physician's immediate supervision or standing orders, will constitute the principal source of sustained industrial health activity for most small industrial concerns.
 - c. Industrial hygiene service directed at improvement of working environment and control of unhealthful exposure provided by physicians and others under the guidance and assistance of the specialized personnel in the state or local bureaus of industrial hygiene.
 - d. A plant health program which will include:
 - (1) Good first aid, emergency, and subsequent medical and surgical care for all industrially induced injuries.
 - (2) Proper health supervision through physical examinations and health education.
 - (3) Good correlation with family physician and other community health

agencies for adequate management of non-occupational sickness and injury.

- (4) Good records of all causes of absence from work as a guide to necessary control, and the establishment of proper preventive measures.

3. Activities of the committee—The committee will be expected to undertake any assignment or local situation which requires the exercise of medical initiative and leadership. It is easy to foresee the many problems which will need to be investigated, the many agencies whose interests and activities will need to be correlated, and the many opportunities for education both to professional and nonprofessional groups which will fall to the lot of this committee. Specific instructions will need to be sent from time to time, and the machinery is already available through bulletins, medical journals, direct correspondence, and field work, to stimulate and maintain interest and to provide reasonably uniform methods of approach to specific problems.

Now it is clear that in this kind of organization the local officer will perform a most useful and important function. In fact, it is not out of reason to suspect that success or failure will depend in a very substantial way on the local health officer's grasp of the issues

and his ability to provide continuity of effort and sustained interest. Very likely these local health officials can benefit by the same kind of postgraduate training as we hope to provide the profession at large. However, advice is and will be sought from the American Public Health Association and elsewhere about the steps which will be necessary to bring local health departments into the industrial hygiene picture to a greater extent than has been the case in the past.

SUMMARY

These are some of the recent developments in the general direction of better preparation for all physicians in industrial health. At no time has the whole subject been of greater importance. I believe that we can and should capitalize upon the present widespread interest to lay sound plans for the future.

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Undergraduate Training of Industrial Hygiene Personnel*

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THE question of adequately training the undergraduate in diagnosis, treatment, prognosis, and control of industrial illnesses through the teaching of industrial health in medical schools as part of the general curriculum has been discussed from time to time. Now we hear that no changes are to be made in the curricula of medical schools as now established.

What will be the result? The quite general lack of knowledge among physicians at large of industrial intoxications and other physiological upsets from conditions or manner of work, and their frequent failure to associate the occupation or the environment of the patient with the disease for which he is seeking advice and treatment, has been a matter of frequent remark.

In speaking on the question of better preparation of medical students, a former U. S. Commissioner of Labor Statistics some years ago said: "I have never in my life had a doctor ask me what I did, what my job was; it may be that some doctors do ask a patient about his work, but the whole question of occupation as an element of disease or ill-being seems to be ignored except by plant physicians or industrial physicians, and I wonder if they reach

one-half of one per cent of the people who are really working on these poisons."

Medical schools today are charged by law, public opinion, and accepted usage with the responsibility of training a sufficient number of students for recognized changes in the profession. In order, therefore, that the product of medical education may be better able to cope with the demands made by present-day changes, of which industrial health at the moment is representative, medical schools should adjust their curricula to supply this demand without impairing those elements which the experience of the past has proved to be fundamental.

When we consider the widespread interest, publicized events, and group activity during recent years in connection with industrial health, together with the vast amount of literature on the subject, it is surprising that courses in industrial health have not been organized and developed on a larger scale by medical schools. While the field of industrial medicine is perhaps too far reaching to be covered fully in the undergraduate years, the curriculum can be adjusted and a certain number of hours devoted to this subject so that the student will have heard of more than lead, mercury, and phosphorous poisoning as described in the orthodox textbooks on medicine.

* Presented before the Industrial Hygiene Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

The contentions that a crowded curriculum must deny the undergraduate an opportunity to have this subject offered to him and that the "newness" of the subject does not yet permit its addition to curricula can be combated by saying that such addition does not mean a revolution in present curricula. However, its continued absence may cause a minor revolution in the thinking of many who are anxious to have it added. In line with this thought, I quote from a statement made by the late Professor Halsted at the end of a long and acrimonious debate over required courses: "The only way to arrange a curriculum is to give the good teachers what they want and take away the hours from the poor ones."

We stand now indeed at a time of great anxiety and difficulty in the affairs of industrial medical education. Industrial health problems have assumed major proportions, owing to the rapidly increasing industrial population and by the impact of war production. These developments are of vital significance to medical education. While it is not necessary to predict the exact form which medical care of the future will assume, even though the general features are indicated, it is important that every medical student be prepared for adjustments in the relationships of the doctor to the changing professional, economic, and social conditions.

Obviously, conditions within and surrounding medical schools vary greatly, and no one system or plan can be applied uniformly. However, consideration should be given to procedures and methods of instruction which will afford the student an experience as nearly comparable to the other well organized courses in the curriculum as possible. Medical schools must accord industrial hygiene greater distinction.

Only a very few medical schools have made this type of instruction available. Industrial hygiene is widely taught as

a relatively minor function of preventive medicine and public health. Problems in industrial medicine are presented without any relation to prevention and control of exposures and only when examples happen to present themselves in clinics or wards. Industrial medical administration has been almost completely ignored. Yet the experience of a number of medical schools amply demonstrates that reasonable acquaintance with the whole subject can be provided at modest expense through judicious use of time and readily available teaching and clinical material.

In 1928, the principal medical schools and colleges were circularized, calling attention to the situation in regard to industrial health and requesting that at least a minimum of class work along this line be included in their courses. Letters were sent to 72 colleges, and they were requested to reply as to what action would likely result from this communication. Replies were received from 44 schools. Of these, 4 stated that they now have a course in industrial hygiene; in 8 the subject was merely included in history taking of patients; 4 said they would consider the matter; 5 definitely stated they would enlarge their work along this line. A number stated that while there was no specific course given, the subject was included in lecture courses, examination of patients, visits to industrial plants, etc. Seventeen schools requested suggestions as to ways in which the subject could be introduced to their students.

In 1940, the Council on Industrial Health of the American Medical Association published statistics along similar lines. Of the 52 medical schools who reported, the average time allotted to industrial hygiene was about 5 hours. The time allotted in 24 schools was 3 hours or less; in only 7 were 10 hours or more scheduled. Twelve schools offered elective courses. Yet it is interesting to note that 60 per cent

of recent graduates encounter industrial medical problems early in their private practice.

A year later (1941), Dr. Wampler of the Medical College of Virginia reported on the results of a questionnaire he mailed to 76 medical schools in the United States and Canada. All but 2 of the schools replied. The average time allotted was 6.7 hours per school. Fifty-one schools reported a varying number of hours ranging from 2 to 30. Twenty-eight of the 51 schools took their students on one or more field trips. Twenty of the schools reported an increase in the hours given to the subject in the last 3 years, and one reported a decrease. Thirty-five of the 51 schools teaching industrial health offer it through their departments of preventive medicine and public health. One school had a department of industrial hygiene in charge of the teaching, and 1 school had a division of industrial hygiene within the department of medicine that gave the course. Eight of the schools reported a clinic in industrial hygiene which the students attend sometime during their stay in school.

It does seem from these survey reports that there has been some advance in interest and some increase in the average number of hours assigned. However, the impression is that the medical schools have not led the way and have taken only a small part in the progress that industrial hygiene has made. If what I have just covered receives no attention, I fear that in future years medical schools may perhaps richly merit the reproaches of their graduates for failing to recognize the signs of the times.

The student actually comes in contact with industrial health problems in every department of the medical school. He encounters it first in pathology, as well as in physiology. Pharmacology and toxicology offer other sources. When he enters the

clinical years, he progresses through the major departments of medicine and surgery, in each of which he is faced with the differential diagnosis of numerous subjective and objective signs and symptoms having in many instances the industrial environment as a background. In all of these departments, and perhaps quite properly so, emphasis is laid on clinical differential diagnosis. However, the order of approach is such that the student obtains a distorted idea of industrial illnesses as an entity.

What then can be offered as a possible working solution to this problem?

The all-important requirement for improved instruction is a unified plan which assigns over-all responsibility for coördinated classroom discussion, field studies, laboratory and section work to one single teaching division, preferably preventive medicine and public health. While there might be a need for considerable dependence on clinical teaching in the medical and surgical aspects of industrial practice, the testimony of recent graduates clearly indicates that the older methods of divided and unrelated instruction fail to provide dependable and reasonably complete information.

As a matter of fact, progress would be greatly accelerated if many more medical schools, especially those in industrial areas, could develop or attract support for the organization of separate teaching divisions in industrial health, each with its own faculty, affiliations for clinical and demonstration material and facilities for laboratory and field investigation and consultation. Under such an arrangement, there would be greatly improved prospects for the attraction of special teaching talent and material, and support for research into a thousand aspects of industrial health crying for investigation.

In planning for instruction in the undergraduate curriculum, we should

keep in mind the following essential requirements:

Undergraduate teaching

1. Required Courses—These courses should provide lectures, laboratory experience, industrial history taking, and record keeping, section work in wards and clinics, and field trips.

2. Elective Courses—Electives should provide opportunity for more detailed and specific study, personal participation in special projects, individual patient study or personal experience in plant or laboratory.

To make this possible, the curriculum makers should interest full-time and part-time industrial physicians in participating regularly in the conduct of these courses. There are many medical schools that already have on their faculty physicians who are in charge of medical departments in industry. Other industrial physicians could be selected according to university standards and offered faculty ratings. This would encourage and permit them to assume leadership in helping to coördinate the isolated and spotty efforts in this field. These physicians might also demonstrate their cases and thereby provide for a general clinical education of the students. The undergraduate will greatly benefit by being able to observe the early physical impairments of industrial exposures and environments. This is being done in a few instances.

What about the course content? Since the course cannot be haphazard, there must be a program outlined in advance. The lectures should include well chosen subjects. It is not necessary to go into detail here as to subject matter. An excellent outline has already been prepared and published through the joint efforts of the Council on Industrial Health of the American Medical Association and the American Association of Industrial Physicians and Surgeons, Committee on Medical Education. Another excellent guide is one compiled by Dr. Robert Legge of the University of California, Berkeley.

The lectures should not be given by one individual, since this course can be made more attractive by group effort. It has been found beneficial to include in our roster of lecturers an industrial hygiene engineer, a chemist, a nurse, a personnel director, and a workmen's compensation expert. These are readily available in industrial areas.

Since it is not proposed that medical students should be made specialists in industrial hygiene, the school that I represent has designated in its required course a minimum of 16 hours, which are scheduled during the second semester of the junior year. Unfortunately, because of the large student enrollment, field trips are not possible.

In some cases the senior year has been selected as the opportune period to offer such training. However, based on 7 years' experience in teaching this subject, it is my opinion that the medical undergraduate is at his peak of enthusiasm in the latter half of his junior year, which accounts for his regular attendance and his keen interest. In the senior year, I have observed that most students are more interested in and occupied with their internship appointments and, in addition, more apt to favor the clinicopathologic courses off the campus, rather than this so-called "new subject" in the classroom.

The elective course of 32 hours is best offered in the senior year. The registration should be limited so as to attract those students who have shown a particular interest during their junior year enrollment. This will eliminate those who merely take the course for credit. The elective course affords an opportunity to offer advanced didactic work, seminars, laboratory demonstrations, field trips, and clinical material. A short thesis on some special subject should be required of each student at the end of the term.

The clinical clerkship, in inter-departmental and inter-dispensary

schedules, which has been developed as a part of undergraduate instruction to provide a practical clinical experience for the student, is analogous, in a sense, to the laboratory work in the basic sciences in the first two medical school years. This requirement can be offered through hospitals, wards, clinics, and out-patient departments associated with the medical school, or in well organized industrial medical departments whose directing officers are faculty members of the university. However, this phase of the training program appears to be unorganized and sporadic, and continues to remain a problem. It needs further study.

Another development in the training program has been the establishment of occupational disease clinics, so organized that they are recognized formally as one of the branches of a dispensary service. However, medico-legal involvements, together with certain laws and regulations varying from state to state, have tended to impede the utilization of this specialized clinic. If such a clinic is to serve the undergraduate, both management and labor must be brought into the picture. They should examine this development critically and sympathetically if a working plan is to be successful. Here it could be hoped to develop and demonstrate for the undergraduate, under the direction of trained and competent instructors, the medical procedures involved in treating or controlling specific occupational diseases.

A student's final opportunity is available during the intern year. Internships should be adjusted to reflect in greater degree the problems of industrial health. A short service in the medical department of some industry would be highly beneficial. This has been made possible for some of our interns through the courtesy of Dr. Will Lyon, Medical Director, International Harvester Company, who is a faculty member of the University of Illinois

College of Medicine. The intern assignment to this plant is for 6 weeks and is closely supervised by the industrial medical department staff. The whole training period is designed to provide maximum educational benefits.

The framework herein presented is as flexible as the staff available, the number of hours allotted, the interrelation with other departments of the school or outside consultants and agencies, and the enthusiasm of the curriculum makers; and on it may be built as many or as few special tricks of pedagogy as the imagination of the total teaching faculty may provide.

The purpose of the course should be to inspire, to stimulate, to challenge the student; to show him what the problems are, the actual work he may have to do. The health problems of workers and their environment must be brought to the classroom.

A vast unexplored territory in preventive medicine awaits those who will give special study to many conditions which are incident to employment, and which are as yet in many instances little, if at all, understood. The overwhelming importance of preventing disease through proper supervision of the industrial environment, and the need for adequate preparation of medical students so that as physicians they may serve as guides and overseers in this work, will, it is hoped, become increasingly apparent to those who prepare the medical curriculum. Fundamentally, the science of medicine is applicable to industry.

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Comparative Study of Presumptive and Confirmative Media for Bacteria of the Coliform Group and for Fecal Streptococci*

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IN spite of the enormous amount of work which has been done to develop simple and efficient methods for the isolation of coliform bacteria from water and other materials, there are still loopholes for inefficiency in our standard procedure. The present practice of first increasing the numbers of coliform bacteria in lactose broth at 37° C. and then confirming their presence by inoculating secondary tubes of brilliant green lactose bile broth at the same temperature, is the most practical procedure yet developed. This has been established by McCrady and others, as not only simple but more efficient than the more involved and more costly plate confirmation method. The efficiency and simplicity of this method is indicated by its adoption in the new shellfish procedure. The correlative procedure of confirming the presence of *Escherichia coli* by inoculating secondary tubes of buffered lactose broth, a modified Eijkman medium, from the primary cultures in lactose broth, is also simple and has likewise been demonstrated to be an efficient method for establishing the number of *E. coli* in water and in shellfish.¹

The studies to be reported here were made in an effort to improve still further upon these methods by developing media of greater selectivity for the coliform group and for *E. coli*. The new "EC" medium presented in this paper is the highly buffered lactose broth described by the authors in 1938,² modified by the addition of 0.15 per cent of Difco Bacto bile salts No. 3 and the substitution of Bacto tryptose for Bacto peptone. The virtue of the bile salts mixture lies in its enhancement of the growth of coliform bacteria,³ and its ability to inhibit more or less completely the growth of fecal streptococci and spore-formers. Studies have also been made on the comparative value of confirmation by a secondary fermentation test in brilliant green bile and by the usual E.M.B. (eosin-methylene-blue) plate method.

In addition, studies are reported on the use of a new medium for the isolation of fecal streptococci. There is, apparently, increasing interest in the use of streptococci as an index of fecal pollution in swimming pools. We have examined samples of swimming pool water for several years for three indices of pollution, namely, for bacteria of the coliform group, for *E. coli*, and for fecal streptococci. Streptococci appear to be more resistant to chlorination than coli-

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form bacteria and their absence, for this reason, affords a somewhat wider margin of safety. However, the method of examining the sediment from fermentation tubes for streptococci is not entirely satisfactory. It is a rather cumbersome procedure, and possibly not as efficient in recovering streptococci as it might be.

THE PLATE VERSUS THE SECONDARY TUBE METHOD OF CONFIRMATION

In the first study, the object was to secure additional information on the relative efficiency of confirmation of coliform bacteria from primary lactose broth gas tubes by streaking E.M.B. plates as contrasted with confirmation by inoculation of secondary tubes of brilliant green lactose bile broth. In agreement with the extensive work on this point by McCrady and others in 1937,⁴ no significant difference was found in efficiency of the two methods. The simple method of confirming in secondary tubes of brilliant green lactose bile broth gave less than 1 per cent fewer "positives" than the far more involved plate confirmation method. Neither of these methods was efficient, however, for the isolation of *E. coli*. The number of isolations of *E. coli* from E.M.B. plates made from the primary lactose broth tubes was only 69 per cent

of the number isolated by confirmation in secondary tubes of specially buffered lactose broth² at 45.5° C., while isolations of *E. coli* from E.M.B. plates streaked from the secondary tubes of brilliant green bile broth were only 77 per cent of the number obtained by confirmation at 45.5° C. (see Table 1).

All primary and secondary fermentation tubes in which gas was produced, were streaked on E.M.B. plates. Confirmations of coliform-like colonies were made in lactose broth at 37° C. Confirmations for *E. coli* were made in Koser's citrate medium and in buffered lactose broth at 45.5° C.

PRIMARY VERSUS SECONDARY USE OF MODIFIED EIJKMAN LACTOSE BROTH FOR ISOLATION OF ESCHERICHIA COLI

A second study was made to secure further evidence of the efficiency of the simple secondary tube confirmation for *E. coli*. This method consisted of transferring a 3 mm. loopful of culture from a primary lactose broth gas tube at 37° C. to a secondary tube of buffered lactose broth at 45.5° C. The efficiency of this method was compared with that of isolation by direct inoculation of the water into primary tubes of buffered lactose broth at 45.5° C. Primary inoculation into modified Eijkman medium

TABLE 1

Comparison of the Efficiency of Standard Lactose Broth with Brilliant Green Lactose Bile Broth and Modified Eijkman Lactose Broth for the Isolation of Coliform Bacteria and Escherichia coli from 70 Samples of Water

| | Primary Standard lactose broth 37° C. | Secondary Confirmation | |
|--|--|------------------------|--|
| | | B.G.L.B. 37° C. | Modified Eijkman lactose medium 45.5° C. |
| Total tubes inoculated | 1,750 | .... | .... |
| Total tubes having gas at 24 and 48 hours | 718 | 671 | 555 |
| Total tubes confirmed, coliform group | 669* | 663* | .... |
| Total tubes confirmed, <i>Escherichia coli</i> | 378 | 421 | 546 |
| Percentage gas tubes confirmed for <i>Escherichia coli</i> | 69.0 | 77.0 | 100 † |

* Confirmed on E.M.B. and in secondary standard lactose broth

† Arbitrarily established for comparison

B.G.L.B. = Brilliant green lactose bile broth

TABLE 2

Relative Efficiency of Primary Versus Secondary Use of Modified Eijkman Lactose Broth for Isolation of Escherichia coli from 54 Samples of Water

| | Primary Standard lactose broth | Secondary Confirmation Modified Eijkman lactose medium 45.5° C. | | Primary Modified Eijkman lactose medium 45.5° C. |
|--|---|--|----------|---|
| | | B.G.L.B. | 45.5° C. | |
| Total tubes inoculated | 1,350 | .... | .... | 1,350 |
| Total tubes having gas at 24 and 48 hours | 554 | 509 | 421 | 499 |
| Total tubes confirmed, coliform group | 511 | 506 | .... | .... |
| Total tubes confirmed, <i>Escherichia coli</i> | 322 | 355 | 415 | 467 |
| Percentage gas tubes confirmed for <i>Escherichia coli</i> | 68.5 | 76.0 | 88.6 | 100* |

* Arbitrarily established for comparison

at 45.5° C. yielded over 11 per cent more "positives" for *E. coli* (see Table 2). In previous studies,¹ similar differences had also been established though the percentages varied. The average difference in the various studies was approximately 15 per cent.

Although there was a significantly lower percentage of isolations of *E. coli* by the simpler method of confirmation in secondary tubes of buffered lactose broth at 45.5° C., the simplicity of the method warrants its use for many purposes. It is especially useful when gross coliform as well as *E. coli* determinations must be made, since the same

primary standard lactose broth culture can be used for a secondary tube confirmation of the coliform group bacteria and for a secondary tube confirmation of *E. coli*. As seen from a comparison of Table 1 and Table 2, the difference between the number of confirmations for the coliform group by the plate versus the secondary (brilliant green lactose bile broth) tube method is insignificant, less than 1 per cent.

LAURYL SULFATE TRYPTOSE BROTH VERSUS STANDARD LACTOSE BROTH

A third study was made to secure further evidence of the value of the new

TABLE 3

Comparison of Lauryl Sulfate Tryptose Broth and Standard Lactose Broth for the Isolation of Coliform Group Bacteria and Escherichia coli

| No. Sam- ples | Sample | Primary medium 37° C. | Tubes inoculated | Gas tubes 48 hrs | Secondary Confirmation | | | | | |
|---------------------|--|-----------------------------|---------------------|------------------------|--------------------------------------|------|--|------|-------------------------------------|------|
| | | | | | Coliform group B.G.L.B. 37° C. | | Escherichia coli Modified Eijkman 45.5° C. | | Coliform group false presumptive | |
| | | | | | No. | % | No | % | | |
| | | | | | No. | % | No. | % | No. | % |
| 70 | Tap water, treated | SLB* | 560 | 57 | 17 | 29.8 | 3 | 5.3 | 40 | 70.0 |
| | | LST† | 560 | 33 | 30 | 91.0 | 4 | 12.1 | 3 | 9.1 |
| 43 | Tap water untreated | SLB | 344 | 117 | 60 | 51.3 | 27 | 23.0 | 57 | 48.6 |
| | | LST | 344 | 105 | 79 | 75.2 | 30 | 28.6 | 26 | 24.9 |
| 14 | Well and spring water, untreated | SLB | 112 | 31 | 29 | 93.6 | 13 | 42.0 | 2 | 6.5 |
| | | LST | 112 | 49 | 37 | 75.5 | 16 | 32.6 | 12 | 24.5 |
| 127 | Summary | SLB | 1,016 | 205 | 106 | 51.6 | 43 | 21.0 | 99 | 48.3 |
| | | LST | 1,016 | 187 | 146 | 78.0 | 50 | 26.7 | 41 | 21.9 |

* SLB = Standard lactose broth

† LST = Lauryl sulfate tryptose broth

B.G.L.B. = Brilliant green lactose bile broth

lauryl sulfate tryptose broth of Mallmann and Darby.⁵ The results presented here confirm the claims of the authors. In 1,016 primary fermentation tubes inoculated with various amounts of water from 127 samples, 78 per cent of the lauryl sulfate tryptose gas tubes were confirmed for the coliform group in contrast to only 51.6 per cent of the standard lactose broth gas tubes, a difference of 26.4 per cent. This increase in the number of coliform group isolations resulted in an increase in the number of isolations of *E. coli* when secondary buffered lactose broth confirmation at 45.5° C. was used. There were more than twice the number of false presumptives (gas in 48 hour primary tubes) for the standard lactose broth as for the lauryl sulfate tryptose broth (see Table 3).

A NEW "EC" MEDIUM FOR THE COLIFORM GROUP AT 37° C. AND FOR ESCHERICHIA COLI WHEN USED AT 45.5° C.

Although the inhibitive action of bile salts against Gram-positive bacteria was well known, earlier attempts of the authors to use bile salts to secure a more selective medium for coliform bacteria and especially for *E. coli* had not

been successful. Use of MacConkey's bile salt medium at 45.5° C. was tried, but was not found to be as satisfactory as the authors' special buffered lactose broth⁶ for the isolation of *E. coli*. The use of Bacto bile salts No. 3 in buffered lactose broth both at 37° C. and at 45.5° C. has, however, given excellent results with a limited number of samples. The formula for this medium is as follows:

"EC" MEDIUM

| <i>Ingredient</i> | <i>Gm. or ml.</i> |
|---------------------------------|-------------------|
| Distilled water | 1,000 ml. |
| Bacto tryptose | 20 gm. |
| NaCl | 5 gm. |
| Lactose | 5 gm. |
| K ₂ HPO ₄ | 4 gm. |
| KH ₂ PO ₄ | 1.5 gm. |
| Bacto bile salts No. 3 | 1.5 gm. |

Titration of pH and filtration not necessary.
Final pH 6.9. Sterilize in autoclave at 15 lb. pure steam pressure for 15 minutes.

The ability of this medium to inhibit fecal streptococci was strikingly demonstrated when inoculations of mixed cultures of coliform bacteria and fecal streptococci were made. After incubation at either 37° C. or 45.5° C., with the exception of an occasional streptococcus remaining from the original

TABLE 4

Comparison of "EC" Medium with Standard Lactose Broth as a Primary Medium for Isolation of Coliform Bacteria at 37° C. and as a Secondary Confirming Medium for *Escherichia coli* at 45.5° C.

| No. Samples | Sample | Primary medium 37° C. | Tubes inoculated | Gas tubes 48 hrs | Secondary Confirmation | | | | | |
|-------------|----------------------------------|-----------------------|------------------|------------------|--------------------------------|-------|--------------------------------|------|----------------------------------|------|
| | | | | | Coliform group B.G.L.B. 37° C. | | Escherichia coli "EC" 45.5° C. | | Coliform group false-presumptive | |
| | | | | | No. | % | No. | % | No. | % |
| 64 | Tap water, treated | SLB | 512 | 80 | 6 | 7.5 | 0 | .... | 74 | 92.5 |
| | | "EC" | 512 | 17 | 17 | 100.0 | 1 | 5.9 | 0 | .... |
| 43 | Tap water, untreated | SLB | 344 | 52 | 27 | 52.0 | 14 | 52.0 | 25 | 48.0 |
| | | "EC" | 344 | 24 | 24 | 100.0 | 14 | 58.3 | 0 | .... |
| 40 | Raw water, well and spring water | SLB | 320 | 174 | 94 | 54.0 | 69 | 39.8 | 80 | 46.0 |
| | | "EC" | 320 | 104 | 104 | 100.0 | 68 | 65.3 | 0 | .... |
| 147 | Summary | SLB | 1,176 | 306 | 127 | 41.5 | 83 | 27.1 | 179 | 58.5 |
| | | "EC" | 1,176 | 145 | 145 | 100.0 | 83 | 57.3 | 0 | .... |

SLB = Standard lactose broth
B.G.L.B. = Brilliant green lactose bile broth

"EC" = *Escherichia coli* medium

transfer, only Gram-negative rods could be found.

When 147 samples of water were inoculated, in parallel, into both standard lactose broth and the new "EC" medium, 12.5 per cent more positive coliform isolations were obtained with the latter. The specificity of the new "EC" (*E. coli*) medium in this small series of samples, was 100 per cent. Every primary gas tube was confirmed for coliform bacteria (see Table 4).

It was of interest that the same number of isolations of *E. coli* were obtained from secondary inoculations into the "EC" medium at 45.5° C. regardless of whether the primary inoculation had been made into "EC" medium at 37° C. or into standard lactose broth at 37° C. However, due to the fact that no false coliform presumptives occurred with the new "EC" medium when used at 37° C., the percentage of confirmations for *E. coli* was double that obtained with the standard lactose broth.

COMPARATIVE VALUE OF "EC" AND LAURYL SULFATE TRYPTOSE MEDIA

The question arose as to the comparative values of the "EC" broth and Mallmann's lauryl sulfate tryptose

broth. More extensive work needs to be done in this respect, but a comparative study was made on 33 stool specimens and 25 samples of raw sewage (see Table 5). High selectivity of the "EC" medium for bacteria of the coliform group was observed. Both the lauryl sulfate tryptose medium and the "EC" medium gave excellent results, since practically the same number of coliform organisms was recovered. The specificity of the "EC" medium appeared to be slightly better, since 100 per cent of the sewage gas tubes were confirmed for coliform bacteria by this medium in contrast to 98.7 per cent by the lauryl sulfate tryptose gas tubes. The "EC" medium almost completely inhibited the growth of fecal streptococci as shown by the use of the "SF" medium, which will be described next (see Table 5).

A NEW "SF" MEDIUM FOR STREPTOCOCCUS FAECALIS

The need for a selective medium for fecal streptococci which has certain values as an index of pollution in swimming pools, has been referred to. A new medium known as "SF" (*Streptococcus faecalis*) was devised for this purpose.

TABLE 5

Comparative Value of Standard Lactose Broth, Lauryl Sulfate Broth and "EC" Broth for Recovery of Coliform Bacteria and *Escherichia coli* from Feces and Sewage Also Value of "SF" Medium for Isolation of *Streptococcus faecalis*

| Sample | Primary medium | Tubes inoculated | Gas tubes 48 hr. | Secondary Confirmation | | |
|-------------------------|----------------|------------------|------------------|--------------------------------|--------------------------------------|-------------------------------------|
| | | | | Coliform group B.G.L.B. 37° C. | <i>Escherichia coli</i> "EC" 45.5° C | <i>Strep. faecalis</i> "SF" 45.5° C |
| Fecal (33 samples) | SLB | 1,188 | 733 | 727 | 684 | 692. |
| | LST | 1,188 | 731 | 730 | 719 | 701. |
| | "EC" | 1,188 | 732 | 732 | 722 | 29 |
| Raw sewage (25 samples) | SLB | 900 | 382 | 363 | 321 | 334 |
| | LST | 900 | 384 | 379 | 320 | 362 |
| | "EC" | 900 | 378 | 378 | 321 | 23 |

SLB = Standard lactose broth

LST = Lauryl sulfate tryptose broth

"EC" = *Escherichia coli* medium

"SF" = *Strep. faecalis* medium

TABLE 6

Comparative Selective Action of Buffered Lactose Broth (Modified Eijkman Medium)
 "EC," and "SF" Media for *Escherichia coli* and Fecal Streptococci in
 112 Raw Milk Samples

| Organisms present | (1) Raw milk direct to buf. lact. broth 45.5° C. | | (2) Trans. from (1) to (2) "EC" at 45.5° C. | | (3) Trans. from (1) to (3) "SF" at 45.5° C. | |
|--|---|---------------|--|---------------|--|---------------|
| | Fecal strep. | Esch. coli | Fecal strep. | Esch. coli | Fecal strep. | Esch. coli |
| Fecal strep. and <i>Escherichia coli</i> | 52 | 52 | 0 | 52 | 52 | 0 |
| Fecal strep. only | 18 | 0 | 0 | 15 | 18 | 0 |
| <i>Escherichia coli</i> only | 0 | 30 | 0 | 30 | 5 | 0 |
| Negative for both | 0(12) | 0 | 0 | 3 | 8 | 0 |

The medium combines the use of an inhibiting agent, sodium azide, for Gram-negative bacteria with temperature selection at 45.5° C. As a result of the work of Snyder and Lichstein⁷ and Hajna and Perry⁸ a concentration of sodium azide was decided upon that would allow streptococci to grow and yet restrict the growth of Gram-negative bacteria. The ordinary preponderance of Gram-negative over Gram-positive bacteria in fecal specimens cultured in the Eijkman medium is practically reversed by this concentration of sodium azide. The choice of the incubating temperature was decided upon as a result of Sherman's work on the *Enterococcus*⁹ group and by the authors' studies on antagonism between *E. coli* and *S. faecalis*.⁸ This medium has proved highly specific for fecal streptococci. The appearance of growth in the "SF" medium at a temperature of 45.5° C. and an acid reaction, as shown by the brom cresol purple indicator in the medium, are almost complete evidence of the presence of *S. faecalis*. The formula of this new "SF" medium is given here.

Both "EC" and "SF" media have been found highly selective for coliform bacteria and for fecal streptococci, respectively, in milk (see Table 6).

"SF" MEDIUM

| Ingredient | Gm. or ml. |
|---|------------|
| Distilled water | 1,000 ml. |
| Bacto tryptone | 20 gm. |
| NaCl | 5 gm. |
| Glucose | 5 gm. |
| K ₂ HPO ₄ | 4 gm. |
| KH ₂ PO ₄ | 1.5 gm. |
| Sodium azide NaN ₃ | 0.5 gm. |
| Brom cresol purple (1.6% alc. sol.) indicator | 2 ml. |

Sterilize in autoclave at 15 lb. pure steam pressure for 15 minutes.

SUMMARY

1. Confirmation of coliform bacteria by inoculation of secondary tubes of brilliant green lactose bile broth has been found as efficient as the more involved E.M.B. plate method.

2. Confirmation of *Escherichia coli* by inoculation of secondary tubes of buffered lactose broth at 45.5° C. is also a simple practical method. The addition of 0.15 per cent of Bacto bile salts No. 3 to this medium, with a slight modification as to amounts of other ingredients, promises a method of efficiency comparable to the brilliant green lactose bile broth method for the coliform group.

3. Lauryl sulfate tryptose broth has been found to yield many more positives for the coliform group than standard lactose broth and to give comparatively few false presumptive reactions.

4. A new "EC" (*E. coli*) medium has been found equally as efficient for the isolation of coliform bacteria as lauryl sulfate tryptose broth and to give no false presumptives on a

series of 147 samples of treated and untreated waters. This medium inhibits almost completely fecal streptococci and other Gram-positive bacteria with no apparent inhibition of coliform bacteria.

5. The new "EC" medium can be used equally well for the isolation of coliform bacteria at 37° C. or for the isolation of *E. coli* at 45.5° C. It can be used either as a primary medium for the growth of *E. coli* or as a satisfactory secondary medium for the confirmation of *E. coli*.

6. A new "SF" medium is described which is highly specific at 45.5° C. for fecal streptococci. The mere presence of growth and acid in this medium at 45.5° C. is confirmatory evidence of fecal streptococci. The medium may be inoculated directly with water, milk, or sewage, or may be inoculated from other primary media, such as standard lactose broth.

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NOTE: An article by Dr. W. L. Mallmann describing the use of sodium azide in a medium almost similar to the "SF" medium described in this paper, appeared in the *Sewage Works Journal*, 12:875, 1940. This reference was unknown to the authors at the time this paper was presented.

A Practical Housekeeping Program for Industry*

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IN spite of diligent efforts to find a good definition of the word "housekeeping," I have been unsuccessful. I have also discussed this subject with many people, and most of them gave different interpretations. Possibly there is no exact definition of the word, and, therefore, it may not be presumptuous on my part to say what housekeeping means to me when it is related to an industrial establishment.

Industrial housekeeping means more than the slogan "a place for everything and everything in its place"; it must mean more than painting aisles and sweeping the aisles. To me, it is that indefinable reaction when making an inspection, that here is a plant, well organized, well kept, and on its toes in plant hygiene. For a plant to create this reaction on a trained observer involves a great deal of planned effort and some expenditure by management, and this cannot be accomplished either casually or in a day or two.

Housekeeping is not such a simple matter as it may seem, and so it may not be amiss at this point to review very briefly some of the fundamental considerations underlying good plant housekeeping.

In recent years, the meaning and

scope of housekeeping has expanded until now many understand it to include supervision of sanitary facilities, locker rooms, and the attendant problems of proper water supplies and sewage disposal systems, in addition to the usual cleaning and sweeping operations.

ELEMENTS OF A GOOD PROGRAM

In my opinion, good housekeeping comprises the following elements (these are not necessarily in order of importance):

1. Men and machines should be so placed as to provide the easiest and most efficient flow of production.
2. Operations should be so located that the health hazards, possibly associated with one will not imperil workers on another task.
3. Structural and operational arrangements should be made to permit easy traffic of men and materials within the plant.
4. Adequate space should be allotted for the storage of movable equipment and tools not in current use.
5. A safe water supply and proper sewerage and sewage disposal facilities must be provided.
6. Definite janitor service should be furnished for the regular cleaning of sanitary facilities, locker and eating rooms, windows, lighting fixtures, and other parts of the interior of the plant.
7. Proper maintenance of all equipment must be enforced; this will become a relatively easy matter if the other items are carried out in a conscientious manner.

I shall not bore you with the func-

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tional details involved in the foregoing seven elements of good housekeeping. Detailed information has been furnished by several capable authors and is readily available. However, I shall tell you some of the reasons why good housekeeping is so essential to all plants.

REASONS FOR PROGRAM

A plant may or may not handle material hazardous to health. That is beside the point, but every plant should have a health and a safety program. They are basic to all plants, and I do not know of anyone who would not benefit by having them.

It is my contention, however, that you cannot have either a good health program or a good safety program without the foundation of good housekeeping. What would be the use of passing workers through a screen of physical examinations, assigning them to suitable tasks, and then exposing them, for instance, to heavy dust concentrations often due to poor housekeeping, or to the potential danger of infection because of lack of proper sanitation? What would be the use of having a fine safety program on paper if you exposed workers to accidents because of improper stacking of materials, bad floor conditions, or poor equipment maintenance?

To my mind, the logic of having good housekeeping as a basis for any health maintenance or accident prevention program is quite plain. I do not believe that it is necessary for me to convince you on this point. Rather do I believe that it might be well to study the situation and apply remedies where needed.

We know that the annual loss of industrial man-hours due to occupational mishaps is increasing, and we know from observation that at present housekeeping often is neglected, especially in the smaller plants. Probably there is a definite connection between these two

concurrent experiences due, perhaps, to a combination of emphasis on production, overcrowding of manufacturing facilities, inexperienced labor, and lack of proper supervision.

Whatever the reasons for this state of affairs may be, the results speak for themselves and they are not so good. I suggest that a considerable improvement may be attained by initiating and maintaining a thoroughgoing plan of better housekeeping in all plants, particularly in the smaller plants. In the latter, good housekeeping may frequently be the only readily available means of controlling occupational hazards, and for this reason it is doubly important.

The industrial hygienist takes the first step in establishing the kind of housekeeping program I have in mind. He must make a thorough sale to plant management as otherwise his effort will merely produce sporadic attempts and temporary effects. To be successful, the sale must result in a program that is well conceived and practical. It will then be carried out conscientiously as an everyday routine.

No matter how small the plant, a good housekeeping program will cost some money, both for fixtures and for labor. Therefore, the authority for carrying out the program must be delegated by management to some one person. It is my belief, in the light of past experience, that authority cannot be successfully delegated to a committee because of the frequent inability to get unanimous opinions, procrastination on details, and general inertia. We all know how committees proceed unless one man takes upon himself the burden of getting prompt action. And so, why not appoint one man for the job, in the first place?

In the larger plants which employ a full-time safety director or engineer, he is, of course, the indicated person to assume responsibility for proper house-

keeping, but in the smaller plants, not possessing the services of such a man, the selection will depend on certain considerations.

I do not believe that the plant superintendent is the man for the job. As a rule, his efforts are concentrated on production. In addition to this full-time job, he has numerous other responsibilities, all connected with manufacture and labor. Neither is one of the foremen the man for it. Generally speaking, their world is restricted to just a portion of the plant, and, therefore, they may lack the proper perspective, and their prestige with the workers in other departments may not be such as to permit them to enforce regulations.

It seems to me that the employment manager may fill the bill in most cases. Generally he has the responsibility for hiring personnel, exercises related functions such as group insurance, workmen's compensation, and general welfare activities. He is well known to all employees, is respected because, in many instances, he represents management to them. Moreover, his duties place him in close contact with company officials and his requests receive attention and consideration.

If the plant is too small to have an employment manager, then the responsibility for plant housekeeping could very well devolve on one of the company officials, preferably the treasurer since he is the man who handles the purse strings. It will also be an advantage to have such an official take an active interest in the workers' environment and its attendant difficulties and thereby contribute substantially to a better understanding between labor and management.

Individual conditions will govern the selection, of the man for taking charge of a plant housekeeping program but its importance compels great care in making that selection.

THE PROGRAM

Once the proper man is selected, he will, in company with the superintendent, make a survey of the plant and find the location of bottlenecks caused, for instance, by an outdated arrangement of machines or by a badly timed system of supply and removal of materials. With the superintendent he will decide on the necessary steps to establish a smooth production flow. He will segregate or isolate operations which may inconvenience, annoy, or endanger neighboring operations. He will observe movement of men and materials throughout the plant and, in coöperation with the various departments, decide on the direction of traffic. To that end, he may decide on the relocation of doors, removal of obstructions, demarcation of old and new aiseways, and structural alterations. He will also observe the disposal of little used equipment and tools and will devise a space where they can be stored systematically and not become junk, if of subsequent real value to the company. He will call for the maintenance man and with him make a thorough trip of the plant and inspect machines, protective equipment and other devices, and demand that they be put in good condition immediately, if necessary, and thereafter be reinspected and rechecked at regular intervals.

Having accomplished the foregoing and acquainted himself with the inner workings of his plant, the selectee will consult his state or local health department on matters pertaining to water supplies and sewage disposal, particularly if the plant is not connected with municipal systems. He will also ascertain from his state health department or labor department what regulations are in force relative to sanitary and kindred facilities, and if women are employed in the plant, what special regulations exist for their benefit.

He will make up a list of daily,

weekly, monthly, and quarterly chores that will have to be performed by the janitor, such as cleaning of the various sanitary facilities, windows, light fixtures, etc. He will go over the list in detail with the janitor and personally investigate and supervise the various items on the list. This list may then well be called the janitor's "standing orders," and will have to be carried out faithfully and consistently.

Finally, the housekeeping supervisor will have to draft a schedule for himself for the regular inspection of the plant in order to make certain that there is no slackening in service and that the plant is maintained in apple-pie order.

All this may sound difficult and tedious but all worth while objectives involve work and expenditure, and plant housekeeping is no exception.

Before closing, I should like to say a few words concerning coöperation of the workers. Experience has shown that without the sincere collaboration of labor, management may not have an easy time with the maintenance of good housekeeping in a plant. Industry as a whole has been convinced for a long time that it is good economics to keep workers at their tasks and reduce absenteeism, from whatever cause, to a vanishing point. However, some of the innovations instituted by manage-

ment have often been misunderstood and therefore are opposed by labor. It may be reasonably expected, therefore, that if before a housekeeping program is put into effect, time is taken to explain the program to the workers, the results might be beneficial to all concerned. While this discussion stresses the importance of good plant housekeeping as a foundation for all other health conservation and safety programs, the conclusion should not be drawn that these programs are not advocated. On the contrary, they should be carried on with unabated vigor, but they will be immeasurably strengthened by a good housekeeping program.

To summarize the proposed program:

1. Management appoints a supervisor, preferably the employment manager, to set up and carry out a housekeeping program.
2. Management gives the supervisor authority to incur expense for fixtures and additional labor.
3. Supervisor consults department heads and labor to improve production flow, plant traffic, and storage of unused equipment.
4. Supervisor ascertains state and local regulations concerning sanitation.
5. Supervisor works out a plan with the maintenance man to keep equipment in good condition.
6. Supervisor provides janitor with itemized orders for regular cleaning of the plant interior.
7. Supervisor establishes a routine for the periodic personal inspection of the plant.

Typhoid Vaccine Studies VII: Typhoid-Paratyphoid Vaccine*

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FOUR previous communications^{1, 2, 3, 4} emanating from the Typhoid Research Unit of the Army Medical School have been concerned with studies of monovalent typhoid vaccine. This paper reports our first investigations since World War I of typhoid-paratyphoid vaccine—often referred to as “triple typhoid” and as “T.A.B.” vaccine.

The bacterial content of the typhoid and typhoid-paratyphoid vaccines prepared at the Army Medical School has been changed from time to time since 1916, to meet existing conditions. In 1934 it was simplified to a monovalent typhoid product. These changes have been reviewed in a previous publication.⁷

In September, 1940, the preparation of triple typhoid vaccine was resumed; and since then, the combined T.A.B. product prepared in the Division of Biologic Products of the Army Medical School has consisted of 1,000 million typhoid bacilli and 250 million each of the paratyphoid A and B components per ml. of material. Aside from its modification in bacterial content from any previously used T.A.B. vaccine, the 1940 product is different in respect to the strains of organisms employed in its preparation. The old “Rawlings” strain of *Eberthella typhosa* has been

replaced by the more immunogenically active Panama “carrier” strain 58 (Army Medical School culture collection No. 42-A-58); and the strains of *Salmonella paratyphi* and *Salmonella schottmuelleri* are also different from those formerly used.

SELECTION OF STRAINS OF PARATYPHOID ORGANISMS

Selections of strains of *S. paratyphi* and *S. schottmuelleri* to be used in the 1940 type of T.A.B. vaccine were based, in general, on the same criteria as was the selection of the strain of *E. typhosa* in 1935.⁵ A number of colonially smooth strains of each species were chosen from the Army Medical School culture collection and from outside sources, and titrated for mouse virulence. The most virulent of each species was selected for observations of cultural characteristics and biochemical behavior. Productivity of agglutinins and of protective substances was next determined; and lastly, the capacity of these organisms (prepared as vaccines) actively to immunize mice against heterologous strains of homologous species was ascertained.

No difficulty was experienced in the selection of a suitable Para B organism. Strain 41-H-6 of the Army Medical School culture collection was highly virulent for mice (m.l.d. 1 to 10 organisms in 5 per cent mucin); it produced a high agglutinin titer in rabbits, and the rabbit antiserum conferred a

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high degree of immunity on mice to an heterologous strain of *S. schottmuelleri*. Culturally and biochemically, strain 41-H-6 was a typical Para B organism, growing luxuriantly on infusion agar and emulsifying readily in physiological saline solution. Prepared as a vaccine, this organism protected mice against several hundred m.l.d.'s of an equally virulent strain of *S. schottmuelleri*.

In the case of the Para A culture, however, the most virulent of the strains titrated (41-N-8, A.M.S.) was found to be relatively avirulent, its m.l.d. in 5 per cent mucin ranging between 1 million and 10 million organisms. Otherwise, except for its comparatively sparse growth on infusion agar, this strain of Para A was fairly satisfactory. It was culturally smooth and biochemically typical of *S. paratyphi*, and it produced a satisfactory agglutinin titer in rabbits; but its productivity of immune substances, as determined by the mouse protection test, was difficult of appraisal because of the enormous numbers of test organisms required to represent multiples of the m.l.d. Prepared as a vaccine, it exhibited a demonstrable protection to mice against other strains of Para A, but here again the higher multiples of the m.l.d. amounted to overwhelming doses of foreign protein against which vaccination could not be expected to protect.

The avirulency of *S. paratyphi* 41-N-8 caused us no little concern; and when we learned from an antigenic analysis made in April, 1941, by Edwards⁶ that this strain, as we were carrying it, was deficient in O-antigen I, we instituted a search for an antigenically complete strain which was more virulent than 41-N-8. This search did not end until one year later.

Antigenically complete strains of Para A, as determined by typing with diagnostic sera, were not difficult to find; but invariably they proved to be no more virulent than, or not as virulent

as, our strain of 41-N-8. We adhered to the belief that virulency was somehow correlated with immunogenicity—but only because vaccines prepared with these avirulent but antigenically complete strains of *S. paratyphi* did not protect mice as effectively as a vaccine prepared with our antigenically deficient, but somewhat more virulent strain 41-N-8.

As a typical example of the results we obtained when making such comparisons of the immunogenicity of strains of *S. paratyphi*, a representative protocol is reproduced (Table 1) from the first announcement of this finding reported by one of us earlier this year.⁷

Referring to Table 1, strain CA is antigenically complete, being strongly agglutinated by I, II, XII, and a diagnostic sera; yet, when prepared as a vaccine, it is relatively inferior to the antigenically deficient strain 41-N-8.

The point of this discussion is that antigenic completeness of an organism, as determined by typing with diagnostic sera, is not synonymous with immunogenic effectiveness, as determined by active immunization of mice with vaccines or by passive immunization of mice with immune sera produced by vaccines. It is desirable, of course, to use a vaccine strain of an organism which is antigenically complete; but the decisive criterion for its acceptance should be the quality of the organism's performance, as a vaccine, in the animal body.

Our search for a replacement for strain 41-N-8 ended in the receipt of strain HA-6 from Dr. A. Felix, of London. This strain (hereafter referred to as 41-N-22) proved to be more virulent than any culture of Para A we had thus far worked with, its m.l.d. for mice ranging between 10,000 and 1 million organisms in 5 per cent mucin, averaging 100,000 organisms. It is culturally smooth and biochemically typical of *S. paratyphi*; upon being typed with diag-

TABLE 1

A Comparison of the Degree of Immunity Produced in Mice by Vaccines Prepared with an Antigenically Complete Strain of S. paratyphi (CA), and by an Antigenically Deficient, but Somewhat More Virulent, Strain of S. paratyphi (41-N-8)

Results Expressed as a Fraction, the Denominator of Which Indicates the Number of Mice Subjected to Respective Dosages, While the Numerator Indicates the Number of These that Died

| Test No. | Dosage of Test Organisms (Expressed in Powers of 10; Exponent in Parentheses) | Results in Mice Vaccinated with: | |
|-----------------|--|---|---|
| | | Para A (CA) Vaccine (I, II, XII; a) | Para A (41-N-8) Vaccine ((I), II, XII; a) |
| 1. | 10(6) | 1/4 | 0/4 |
| | 10(7) | 4/4 | 0/4 |
| | 10(8) | 4/4 | 2/4 |
| 2. | 10(6) | 0/4 | 0/4 |
| | 10(7) | 3/4 | 0/4 |
| | 10(8) | 4/4 | 0/4 |
| 3. | 10(6) | 1/4 | 0/4 |
| | 10(7) | 3/4 | 0/4 |
| | 10(8) | 4/4 | 1/4 |
| | 10(9) | 4/4 | 4/4 |
| Totals—All mice | | 28/40 | 7/40 |

nostic sera, this culture is antigenically complete; and as a final qualification leading to its adoption, a vaccine prepared with strain 41-N-22 proved to be more immunogenically potent than strain 41-N-8 vaccine. Strain 41-N-8 was thereupon discarded, and strain 41-N-22 has been the paratyphoid A component of our T.A.B. vaccine since March 27, 1942 (T.A.B. Pool No. 119). We are not at all certain that this replacement represents the ultimate in Para A organisms, and we still desire to obtain cultures of this organism from recent isolations for comparative studies.

CIRCULATING PROTECTIVE SUBSTANCES PRODUCED BY T.A.B. VACCINE

As a means of determining the immunologic response of the animal body to vaccination, we know of no method which is more practical and more informative than titration of blood serum for protective substances demonstrable by mouse protection tests.²

A number of these tests were performed with sera of young adult males, initially inoculated with T.A.B. vaccine. These individuals had no history of

previous typhoid vaccination, nor of any recognized enteric infection. Their sera were titrated for protective substances active against (1) alien strains of the typhoid-paratyphoid organisms comprising T.A.B. vaccine, (2) heterologous types of *Salmonella*, and (3) coliform organisms containing *Salmonella* O-antigens.

Individual Typhoid, Paratyphoid A, and Paratyphoid B Protective Titers—

These were determined by routinely performed serum protection tests, and are represented here only in tabulated form. It will be noted that the results of titrations of two groups of individuals have been entered in Tables 2, 3, and 4. Titrations of sera from persons vaccinated with the original 1940 type of T.A.B. vaccine, containing the relatively avirulent strain of *S. paratyphi* 41-N-8, were made soon after this vaccine had been adopted by the Army. Replacement of strain 41-N-8 with the more virulent strain 41-N-22 necessitated a revaluation of the T.A.B. product in respect to the production of protective substances active against alien strains of all three organisms comprising T.A.B. vaccine.

TABLE 2

Typhoid Protective Titers of Sera from 85 Previously Unvaccinated Individuals, Before Inoculation and 14 Days After Inoculation with the Original 1940 Type T.A.B. Vaccine, and of a Comparable Group of 73 Individuals Before and 14 Days After Inoculation with the Present T.A.B. Vaccine Containing a Para A Component Prepared with a Relatively Virulent Strain of S. paratyphi

Number and Per cent of Persons Whose Sera, Before and After Vaccination, Protected Mice Against the Dosages of Test Organism in Column on Left. Individuals Vaccinated with:

| Minimum Lethal Doses of the Test Organism | T.A.B. Vaccine (With <i>S. paratyphi</i> 41-N-8) | | | | T.A.B. Vaccine (With <i>S. paratyphi</i> 41-N-22) | | | |
|---|---|----------|-------------------|----------|--|----------|-------------------|----------|
| | Before Vaccination | | After Vaccination | | Before Vaccination | | After Vaccination | |
| | No. of Persons | Per cent | No. of Persons | Per cent | No. of Persons | Per cent | No. of Persons | Per cent |
| | | | | | | | | |
| 100,000 | .. | ..... | 2 | 2.34 | .. | ..... | 3 | 4.10 |
| 10,000 | .. | ..... | 12 | 14.11 | .. | ..... | 25 | 34.24 |
| 1,000 | .. | ..... | 31 | 36.47 | .. | ..... | 19 | 26.02 |
| 100 | .. | ..... | 28 | 32.94 | 1 | 1.36 | 19 | 26.02 |
| 10 | 1 | 1.17 | 12 | 14.11 | 3 | 4.10 | 7 | 9.58 |
| 1 | 10 | 11.76 | .. | ..... | 9 | 12.32 | .. | ..... |
| Less than 1 | 74 | 87.05 | .. | ..... | 60 | 82.19 | .. | ..... |
| Totals | 85 | 99.98 | 85 | 99.97 | 73 | 99.97 | 73 | 99.96 |

COMMENT: It will be noted (Table 2) that some improvement in the production of typhoid protective titers is evident in the group vaccinated with the present T.A.B. product, over the titers produced by the T.A.B. vaccine containing strain 41-N-8 of *S. paratyphi*. However, to those who have followed this series of studies, it will also be noted that even the titers resulting from inoculation with the present vaccine are

not, in general, as high as those following inoculation with monovalent typhoid vaccine. No explanation of this obvious lowering of protective antibody content is offered, but it is thought to be connected in some way with the multiplicity of reaction-provoking substances in T.A.B. vaccine simultaneously administered, as contrasted to the relatively fewer of such substances present in monovalent typhoid vaccine.⁸

TABLE 3

Paratyphoid A Protective Titers of Sera from 80 Previously Unvaccinated Individuals, Before Inoculation and 14 Days After Inoculation with the Original 1940 Type T.A.B. Vaccine, and of a Comparable Group of 69 Individuals Before and 14 Days After Inoculation with the Present T.A.B. Vaccine Containing a Para A Component Prepared with a Relatively Virulent Strain of S. paratyphi

Number and Per cent of Persons Whose Sera, Before and After Vaccination, Protected Mice Against the Dosages of Test Organism in Column on Left. Individuals Vaccinated with:

| Minimum Lethal Doses of the Test Organism | T.A.B. Vaccine (With <i>S. paratyphi</i> 41-N-8) | | | | T.A.B. Vaccine (With <i>S. paratyphi</i> 41-N-22) | | | |
|---|---|----------|-------------------|----------|--|----------|-------------------|----------|
| | Before Vaccination | | After Vaccination | | Before Vaccination | | After Vaccination | |
| | No. of Persons | Per cent | No. of Persons | Per cent | No. of Persons | Per cent | No. of Persons | Per cent |
| | | | | | | | | |
| 1,000 | .. | ..... | .. | ..... | .. | ..... | 1 | 1.44 |
| 100 | .. | ..... | 1 | 1.2 | .. | ..... | 17 | 24.63 |
| 10 | .. | ..... | 17 | 21.2 | .. | ..... | 32 | 46.52 |
| 1 | 5 | 6.25 | 48 | 60.0 | 3 | 4.34 | 19 | 27.39 |
| Less than 1 | 75 | 93.7 | 14 | 17.5 | 66 | 95.65 | .. | ..... |
| Totals | 80 | 99.95 | 80 | 99.9 | 69 | 99.99 | 69 | 99.98 |

COMMENT: These results (Table 3) are characterized by comparatively low protective titers, when expressed as m.l.d.'s of the test organism. They are difficult of interpretation because of the relative avirulency of the test organism, necessitating the administration of enormous numbers of organisms in the challenging doses. And, if the causal organism, in an actual epidemiological situation, were not any more virulent than the test organism used in these tests, the degree of immunity would require restatement in some term other than "m.l.d."

However, replacement of *S. paratyphi* 41-N-8 by the more virulent strain 41-N-22 has, apparently, resulted in the production of a higher average *S. paratyphi* protective titer.

higher than that of the 1940 group, and it is possible that this factor may have influenced the production of comparatively higher titers by the present T.A.B. vaccine.

Cross-immunization against Heterologous Types of Salmonella—Sera of individuals initially vaccinated with T.A.B. vaccine were similarly titrated against various types of *Salmonella*. It was found that significant amounts of protective substances could be demonstrated in such sera, active against *Salmonella typhimurium*, *Salmonella enteritidis*, and against the Java strain of paratyphoid B, but not against *Salmonella choleraesuis* nor *Salmonella oranienburg*; nor were there any demonstrable protective substances active against *Proteus morganii*—an organism

TABLE 4

Paratyphoid B Protective Titers of Sera from 84 Previously Unvaccinated Individuals, Before Inoculation and 14 Days After Inoculation with the Original 1940 Type T.A.B. Vaccine, and of a Comparable Group of 56 Individuals Before and 14 Days After Inoculation with the Present T.A.B. Vaccine Containing a Para A Component Prepared with a Relatively Virulent Strain of S. paratyphi

Number and Per cent of Persons Whose Sera, Before and After Vaccination, Protected Mice Against the Dosages of Test Organism in Column on Left. Individuals Vaccinated with:

| Minimum Lethal Doses of the Test Organism | T.A.B. Vaccine (With <i>S. paratyphi</i> 41-N-8) | | | | T.A.B. Vaccine (With <i>S. paratyphi</i> 41-N-22) | | | |
|---|---|----------|-------------------|----------|--|----------|-------------------|----------|
| | Before Vaccination | | After Vaccination | | Before Vaccination | | After Vaccination | |
| | No. of Persons | Per cent | No. of Persons | Per cent | No. of Persons | Per cent | No. of Persons | Per cent |
| | | | | | | | | |
| 1,000,000 | .. | ..... | .. | ..... | .. | ..... | 19 | 33.91 |
| 100,000 | .. | ..... | 22 | 26.19 | .. | ..... | 25 | 44.64 |
| 10,000 | .. | ..... | 37 | 44.04 | .. | ..... | 11 | 19.64 |
| 1,000 | .. | ..... | 20 | 23.8 | 2 | 3.57 | 1 | 1.78 |
| 100 | 5 | 5.95 | 4 | 4.76 | 20 | 35.71 | .. | ..... |
| 10 | 16 | 19.04 | 1 | 1.19 | 11 | 19.64 | .. | ..... |
| 1 | 31 | 36.9 | .. | ..... | 14 | 25.00 | .. | ..... |
| Less than 1 | 32 | 38.09 | .. | ..... | 9 | 16.07 | .. | ..... |
| Totals | 84 | 99.98 | 84 | 99.98 | 56 | 99.99 | 56 | 99.97 |

COMMENT: The potency of T.A.B. vaccine containing *S. paratyphi* 41-N-22 (Table 4) seems to extend its improved quality to protection against *S. schottmuelleri*. However, it will be noted that the intitial or "natural" immunity of this group of individuals is, in general,

of questionable etiological significance in diarrheal diseases, classified at one time with the *Salmonella* but later withdrawn because of its antigenic alienage. From these results, it appears that T.A.B. vaccine may be considered an effective immunizing agent against cer-

tain types of *Salmonella* which are antigenically related to the vaccine organisms, but not against the "Suipestifer" or paratyphoid C (O-antigens VI-VII) group of *Salmonella* nor against the antigenically unrelated *Pr. morganii*.

Cross-immunization against Strains of Coliform Organisms containing Salmonella Antigens—Two strains of coliform organisms, each containing a different group of *Salmonella* antigens, were obtained from Dr. Philip R. Edwards of the National Salmonella Center in Lexington, Ky. One of these was designated "Coli Fla. 573," and contained O-antigens I and II (as in paratyphoid A); the other was labeled "Coli 3," and was endowed with O-antigens IV and V (as in paratyphoid B). Although neither of these organisms had been indisputably incriminated as the causal organism of an enteric infection, "Coli 3" was thought to have caused

such a condition, based on the absence of any other etiological agent in the stools of the patient and on a significant paratyphoid B agglutinin titer of the patient's serum. Strain "Coli Fla. 573" was as virulent for mice as the more active strains of *S. paratyphi*, its m.l.d. being 1 million organisms in 5 per cent mucin. The "Coli 3" culture was highly virulent for mice, its m.l.d. in mucin being between 100 and 1,000 organisms.

It had previously been learned⁷ that these organisms were loosely connected immunogenically with their paratyphoid simulants; that is, "Coli Fla. 573" was capable of evoking a low degree of immunity to paratyphoid A, and "Coli 3," prepared as a vaccine, produced a somewhat higher degree of immunity to paratyphoid B. It was then desired to learn, in the event these coliform organisms were actually pathogens, whether

TABLE 5

Coliform "Coli Fla. 573" Protective Titers of Sera from 57 Previously Unvaccinated Individuals, Before Inoculation and 14 Days After Inoculation with T.A.B. Vaccine

| Minimum Lethal Doses of the Test Organism | Number and Per cent of Persons Whose Sera, Before and After Inoculation with T.A.B. Vaccine, Protected Mice Against the Dosages of "Coli Fla. 573" Entered in Column on Left | | | |
|---|--|----------|-------------------|----------|
| | Before Vaccination | | After Vaccination | |
| | No. of Persons | Per cent | No. of Persons | Per cent |
| 100 | .. | ..... | 14 | 24.56 |
| 10 | .. | ..... | 19 | 33.33 |
| 1 | 19 | 33.33 | 20 | 35.08 |
| Less than 1 | 38 | 66.66 | 4 | 7.01 |
| Totals | 57 | 99.99 | 57 | 99.98 |

TABLE 6

Coliform "Coli 3" Protective Titers of Sera from 41 Previously Unvaccinated Individuals, Before Inoculation and 14 Days After Inoculation with T.A.B. Vaccine

| Minimum Lethal Doses of the Test Organism | Number and Per cent of Persons Whose Sera, Before and After Inoculation with T.A.B. Vaccine, Protected Mice Against the Dosages of "Coli 3" Entered in Column on Left | | | |
|---|---|----------|-------------------|----------|
| | Before Vaccination | | After Vaccination | |
| | No. of Persons | Per cent | No. of Persons | Per cent |
| 100,000 | .. | ..... | 22 | 53.65 |
| 10,000 | .. | ..... | 17 | 41.46 |
| 1,000 | 8 | 19.51 | 2 | 4.87 |
| 100 | 25 | 60.97 | .. | ..... |
| 10 | 8 | 19.51 | .. | ..... |
| Totals | 41 | 99.99 | 41 | 99.98 |

any demonstrable protective substances active against them were produced in persons inoculated with T.A.B. vaccine. Serum protection tests were therefore performed with the sera of persons initially vaccinated with T.A.B. vaccine, using "Coli Fla. 573" and "Coli 3" respectively as test organisms. The results of these determinations have been recorded in Tables 5 and 6.

COMMENT: Vaccination of humans with T.A.B. vaccine (Table 5) produced demonstrable protective substances active against this coliform organism containing paratyphoid A O-antigens I and II; but, as in the case of serum protection tests against *S. paratyphi*, interpretation of results is difficult because of the relative avirulence of the test organism and the necessity for administering enormous numbers in the challenging doses.

COMMENT: These results (Table 6) indicate that vaccination of persons with T.A.B. vaccine produced significant quantities of protective substances in the blood serum of these individuals, active against the coliform organism containing paratyphoid B O-antigens IV and V. It is interesting to note that, as in the case of titration of these sera for paratyphoid B protective substances, the titers of the sera collected before vaccination are relatively high.

Interest in these coliform organisms is centered around a statistical analysis of the incidence of enteric infections, made in 1937 by Callender and Inmon.⁹ These observers noted that a significant drop in the morbidity of all diarrheal diseases in the United States Army followed, by some months, the introduction of *S. schottmuelleri* in typhoid vaccine, and that an equally significant increase in these diseases followed the withdrawal of the Para B fraction from T.A.B. vaccine. They realized that "the antigenic factors in typhoid [and paratyphoid] immunization by the U. S. Army may have an influence on the

morbidity of diarrheal diseases . . ."; and, referring to the apparent correlation between changes in morbidity and changes in the components of enteric vaccine, they added: "Whether this series of events is due to immunization or not, the coincidence is striking."

Members of genera of the family *Enterobacteriaceae* other than the *Salmonella* are, of course, responsible for much of this heterogeneous group of "diarrheal diseases." Coliform organisms have often been suspected of having some etiological significance, but have never been definitely incriminated as causal organisms of human enteric infection; and even more often, probably, these organisms have escaped attempts to incriminate them solely because of their coliform cultural characteristics.

One instance of the reverse of this was brought to our attention about a year ago—that is, an instance wherein the cultural characteristics of an organism were overlooked (or not determined), the culture being hastily typed with diagnostic *Salmonella* sera and reported as *S. paratyphi* because of its high agglutinability by Para A serum. Later, this culture was found to ferment lactose slowly, and it was subsequently identified as a coliform organism containing Para A antigens.

The question arises—How often, if this latter procedure were followed, would coliform organisms, suspected of playing an etiological rôle in diarrheas, be found to contain *Salmonella* antigens? And this suggests another question: Are these particular coliform organisms the only—or the most common—representatives of the *Escherichia* capable of producing enteric symptoms in man? If so, the connection between morbidity of diarrheal diseases and the antigenic content of enteric vaccines becomes evident. A potentially productive field for investigation of this type of enteric infection is open to the epidemiologist.

SUMMARY

Studies have been presented on the special problems involved in the selection of desirable vaccine strains of organisms comprising T.A.B. vaccine, and on the production of circulating protective substances by vaccination with T.A.B. vaccine.

The apparent relationship of typhoid-paratyphoid immunization to the morbidity of all diarrheal diseases in the United States Army has been briefly discussed.

Vaccine strains of organisms were chosen on the basis of their virulence for mice on the one hand, and for their immunogenic potency as demonstrated by active immunization of mice, on the other.

Initial vaccination of young adult males with T.A.B. vaccine produced significant amounts of protective substances in the blood serum active against *E. typhosa*, *S. paratyphi*, *S. schottmuelleri*, the Java strain of paratyphoid B, *S. enteritidis*, *S. typhimurium*, and against two coliform organisms containing *Salmonella* O-antigens I and II, and IV and V, respectively. Such vaccination failed to produce, by the method used for detection, demonstrable protective substances active against *S. choleraesuis*, *S. oranienburg*, and *Pr. morganii*.

Replacement of the originally selected strain of *S. paratyphi* as the Para A component of T.A.B. vaccine with a relatively more virulent strain of this organism was followed by a general improvement in the potency of the combined product, as evidenced by significantly higher protective titers for

E. typhosa, *S. paratyphi*, and *S. schottmuelleri*.

Coliform organisms containing *Salmonella* antigens offer an interesting group of possible etiological agents for study, particularly in view of the antigenic and immunogenic relationship between these and the T.A.B. vaccine organisms. It is probable that, if coliform organisms suspected of causing or inciting enteric infections were typed with diagnostic *Salmonella* sera, many more of such antigenic relationships would be revealed.

ACKNOWLEDGMENTS—We are indebted to Colonel George R. Callender, M.C., Director, Army Medical School, for his interest, suggestions, and helpful criticisms in this work; and to Dr. Mario Mollari, Professor of Bacteriology and Preventive Medicine, Georgetown University Medical School, for securing the cooperation of medical students as subjects for vaccination and as a source of test material.

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THE USE AND ABUSE OF EPIDEMICS or THE SYLLOGISTIC BLITZKRIEG

IN these days of rationing, an unwanted health official must be removed from office by some means other than choking him to death with butter. Of the substitute measures available, one of the most effective and at the same time least suspected by the public, is what may be called the *syllogistic blitzkrieg*. In applying this devastating procedure, one needs only to generalize along seemingly sound lines, then with some fanfare and drama, to go from the general to the particular, thus: (1) The occurrence of an epidemic is evidence of the incompetence of the health official having jurisdiction; (2) an epidemic has occurred in Dr. John Smith's jurisdiction; (therefore) (3) Dr. John Smith is incompetent.

The major proposition here is one that might be true in a particular instance, but as it cannot be applied in all cases, it is not a sound premise. However, it can easily be brought to focus in the public mind, and in expert blitzkrieging, it is seldom necessary even to state it. About all that one need do is to furnish the second or intermediate step: "An epidemic has occurred in Dr. John Smith's jurisdiction." Give this some publicity, with perhaps a few indignant letters to the newspapers, and, bingo, Dr. Smith's incompetence is established beyond peradventure of doubt, and out he goes: And all this without scrutiny of the major premise or, for that matter, without inquiry as to whether or not an epidemic really exists.

The effectiveness of the technic depends upon the fact that, though the man on the street is not likely to be able to define a syllogism, he is fond of putting two and two together and thus tends to reason along these deadly lines. This is a fine thing for a democracy, as long as the ability to recognize two and two does not require any special training or technical knowledge. If that necessity does arise, then the whole syllogistic process becomes highly dangerous, for there are millions of false premises lying around loose and one may, by mistake or design,

use such propositions to prove that all cats have two tails, or that white is black, or that a health official is a most incompetent fellow.

All of this leads to a declaration that we are not happy about a recent sequence of events in the Mental Hygiene Commission of New York State. These events, in effect, were as follows: (1) There broke, in the newspapers, a story that there was an outbreak of amebic dysentery in the Creedmore (psychiatric) State Hospital. (2) An investigating committee reported conditions as distressing and there was a great furore. (3) The Commissioner of Mental Hygiene "retired." (4) The state law was changed so that it will permit choice of a mental hygiene commissioner solely for his ability as an administrator.

The retiring commissioner may or may not have been incompetent. That is not the issue. The disturbing thing is that amebic dysentery in a psychopathic population was the criterion used to determine competency. In such an institution, with depleted help and with patients in many instances serving as attendants, one may not expect the amebic dysentery case rate or carrier rate to be as low as in normal persons living normal lives. To be astonished that it is higher is, from an epidemiological standpoint, on a par with astonishment that there are more tombstones in a cemetery than in a victory garden. And because it is misleading to count carriers of *Entamoeba histolytica* cysts as cases of amebic dysentery, epidemiologists, in this particular instance, would be interested in knowing just how rates were calculated. Was the outbreak made up of newly discovered and currently occurring cases of amebic dysentery, or was its substance to be found in data from a stool survey, with detection of carriers? The two things are quite different. One wonders, too, how the new law permitting appointment of a mental hygiene commissioner "solely for his ability as an administrator," will lessen the amebic dysentery carrier or case rate in this institution, or in others, if looked for in the future. The sane and unemotional New York Academy of Medicine did not think this change in the law wise, and opposed it in a letter to the Governor.

Finally, we should like to know if the conclusions reached in this episode were on the recommendation of those experienced in public health administration and epidemiology. We are inclined to doubt it; and though conceivably the action taken may have been prompted by the purest of motives, the sequence of events bears many of the earmarks of the syllogistic blitzkrieg. New York is one of the great states of the Union. For many years its governors have set, for those in other states, a fine example in the way they have dealt with public health problems. It is to be hoped that this well earned and nationally valuable prestige is not to be impaired.

GRASS ROOTS HEALTH EDUCATION

THERE came into our hands a short time ago the February number of *Health Briefs* published by the Tennessee Department of Public Health. This issue is given over almost entirely to the report of health education work done by a class in a Negro junior high school in one of the larger cities of the state.

This report is a live document, a sound one, a significant one; and whoever laid out this piece of work tapped the very grass roots of common sense. That this is so is evidenced by the opening statement of these quite young students:

"We . . . wish to make our 'essay' as practical as possible. We shall confine our discussion to the four topics: (1) What people know about tuberculosis. (2) What people don't know about tuberculosis. (3) What facts students consider the most important. (4) What needs to be done about it."

And then, *mirabile dictu*, they did an amazing thing. They actually went out and learned what people know and don't know about tuberculosis. But before doing this they charted their course. They defined their terms. They practised interviewing. They listed questions to be asked and, in order to avoid bias and misinterpretation in answers to their questions, they decided to write every reply in the exact phraseology used by the persons interviewed. They asked, "What do you think tuberculosis is?" and received replies varying from, "Honey, I don't know what it is" to "A disease caused from drinking and dancing." Sixty per cent of those questioned believed tuberculosis to be inherited and only 25 per cent were of the opinion that it could be cured.

Another question asked was, "Do you believe there is any medicine that will cure tuberculosis? If any, what medicine?" The report states that there were many correct answers to that question and this is encouraging; but encouraging, too, and of interest is this statement by the students, ". . . our emotions upon reading the answers ran from surprise, disgust, amazement, and approval to pity." This is quite understandable in view of some of the answers: "Make a stew of rich fat dog," "There is a little black pill that you get at the drugstone," "I know a lady who ate 1,966 eggs in one year and drank one-half gallon of milk a day. She got well." (Ah there, Health Educators!)

Analyzing their findings, considering them in terms of age-range of persons interviewed and by occupation and educational background, these junior high school pupils went on to express what they thought ought to be done in providing public health education in regard to tuberculosis. "Through this survey and class discussion we concluded that there were certain things which would increase the general information about tuberculosis, reduce, and in time eradicate this terrible disease." They then presented conclusions which, coming from the firing line as they do, represent tactics rather than strategy, but are shrewd and sound within their limitations.

Here is no second-hand perusing of abstract information, no dallying with esoteric terminology. On the contrary, it represents a serious and direct approach to an actual and serious problem. We wish there might be more of this sort of thing in health education. We give it the title "grass roots health education" not because it comes from a state where the grass is very beautiful but because it goes deeply into the soil in which health education must grow.

LETTERS TO THE EDITOR

TO THE EDITOR:

The letter from Mr. H. M. C. Luykx published in the April issue of the *American Journal of Public Health* raises several interesting questions.

A numerical expression such as 12.2 ± 1.1 is certainly subject to misinterpretation. A brief poll among my colleagues here in the Census Bureau indicates, indeed, considerable difference of opinion as to the likely meaning of a value given after the \pm sign if presented without explanation. In spite of this fact I doubt if it is possible or desirable to eliminate the use of the \pm sign because of the economy of expression which it permits. This is particularly the case in tabular presentation. The consensus here is that, if clearly defined in the article, the notation is useful and that in the more recent American statistical literature it is now customary and acceptable to give the value of the *standard error* after the \pm sign. However, in certain statistical presentations it might be desirable to give some multiple of the standard error to indicate the complete range of values corresponding to a probability value determined by the criterion of significance.

Attention should be called to the confusion which might result from the fourth paragraph of Mr. Luykx' letter. This paragraph discusses the possible

range of sample mean values for all possible hypotheses regarding the "true" or population mean value. Except in special cases the statistical investigator is not interested in the overall range of possible sample values for all acceptable hypotheses, but rather in the range of the hypotheses themselves. The investigator is interested in the "true mean incubation period" and, using Mr. Luykx' figures and probability limits, this might well be within the range from 8.9 to 15.5 days. That is to say, the obtained mean value of 12.2 days is not incompatible with the hypothesis that the "true" mean incubation period is 8.9 days, nor with the hypothesis that the "true" mean incubation period value is 15.5 days, nor with the hypothesis that it is some stated number between these limits. To suggest that "... one should not be surprised to find an average anywhere . . . between 5.6 days and 18.8 days" obscures the fact of greatest interest, namely, that the population mean value probably lies between 8.9 and 15.5.

March 27, 1943.

FORREST E. LINDER, *Assistant Chief Statistician for Vital Statistics, Bureau of the Census, Washington, D. C.*

TO THE EDITOR:

It must be true that some persons will misunderstand the meaning of "plus or minus" or the sign \pm . Mr. Luykx' point is that statisticians will not know whether reference is to the probable error or to the standard deviation; and that non-statisticians may

regard the sign as referring to the highest and lowest values.

It is not my impression that readers of the *Journal* with any statistical training would interpret \pm as indicating anything but the probable error. Certainly the textbooks and

literature in our field generally give this interpretation.

That the uninitiated might misunderstand the \pm sign is perfectly true, and it would therefore probably be best to write, for example, "standard deviation (or S.D.) = 1.6," or if the writer insists, "probable error (or P.E.) = 1.1," the probable error being .6745 times the standard deviation.

Even so, I am not sure that in re-proving the *American Journal of Public Health*, Mr. Luykx is spanking the right baby. After all, this *Journal*

merely quoted the *Journal of the A.M.A.* Moreover, the responsibility for reforms of this type can more reasonably be placed upon statistical groups, teachers, and textbooks writers. It would hardly do for the *Journal* to say in effect to its contributors, "Now you go to your room and write so-and-so-many times, 'Use S.D. or P.E. instead of \pm .'"

March 24, 1943.

A. W. HEDRICH, *Chief, Bureau of Vital Statistics, Maryland Department of Health*

TO THE EDITOR:

I have read Mr. Luykx' letter with much interest. I agree with him that the plus or minus symbol attached to a mean will not be very enlightening to readers untrained in statistics. I am inclined to believe, however, that these readers skip over such items with the greatest of ease and only readers who have been exposed to courses in statistics at one time or another notice these pluses and minuses at all. For them and their amnesias the author should not be blamed. It would be well, however, to place a P.E. (probable error) or an S.E. (standard error) after the symbol in order to insure the exact meaning.

Mr. Luykx' letter raises two points, however, which cannot be dismissed so lightly. First, he, as well as the author he quotes, accepts a normal sampling range for a biological fact such as "incubation period" which may have a range quite different from what normal sampling theory would call for. Since there is surely a lower biological limit to the incubation period, the mechanical application of standard error theory to mean incubation period, especially when the sample is rela-

tively small, may result in the paradox of including biologically impossible events within the range of statistical probability. Examples of actually impossible events made probable by erroneous statistical methods are not hard to find. If the death rate for a given disease is, say $.95 \pm .05$ S.E., we should conclude statistically that the odds are 19:1 that the true death rate lies somewhere between 85 and 105 per 100!

A second point raised by this letter is the procedure of assuming that the sample mean is equal to the true mean. This is an outmoded way of regarding the problem and can lead only to erroneous results. We do not need to make this assumption and furthermore, we cannot. We can, however, conclude the following: If the observed mean is 12.2 and the standard error is 1.1, then it follows that it is more probable that the true mean will lie somewhere between 12.2 ± 1.1 S.E. rather than outside of these limits. In fact, it will lie within these limits 68.26 per cent of the time (or odds of 2:1) and between $12.2 \pm 2(1.1)$ S.E. 95 per cent of the time (or odds of 19:1) and so forth. This is all we can deduce from

the given data. We can, however, test any hypothesis that may be proposed about the true mean. For example, if there is cogent reason to assume that the true mean is 12, we can conclude that the observed sample is not an abnormal sample, for the difference between the observed and true mean in that case is only .2 which has a critical

ratio of $.2/1.1 = .18$, and consequently is not significant.

March 23, 1943.

JOSEPH ZUBIN, *Associate Research Psychologist and Instructor in Psychiatry, New York State Psychiatric Institute and Hospital*

TO THE EDITOR:

While seconding Mr. Luykx' objections to the reference in your January issue to an average incubation period of "12.2 *plus or minus* 1.1 days," I should like to go further and risk charges of treason to my profession by inquiring why in this case any reference should be made to an *average* incubation period.

The article to which reference is made (A. E. Casey, The Incubation Period in Epidemic Poliomyelitis, *Journal of the American Medical Association*, 120, 11:805 (November 14), 1942, contains a table from which the following interesting facts can be derived:

1. In none of a series of 37 secondary cases of poliomyelitis were prodromal symptoms observed prior to the 5th day after exposure to the primary case.

2. The onset of symptoms occurred in every case but one during the 5th through 22nd days after exposure, with no very pronounced concentration of cases at any point within that interval.

3. In a single case the onset of symptoms was observed 35 days after exposure.

As a layman whose information about poliomyelitis comes almost wholly from newspapers and announcements of Birthday Balls, and as a pragmatist who has messed about in various kinds of statistics, I would infer from these findings that a child suspected of having had a single exposure ought to be watched carefully for symptoms during the period indicated. I should also

infer that the case in which the incubation period appeared to be 35 days might warrant further investigation if possible to discover any peculiarities in the patient's characteristics, history, or environment which might hypothetically be associated with the unusually long incubation period.

For purposes of comparing Dr. Casey's data with other series of observations, conventional measures of central tendency and dispersion might be useful, but in drawing practical conclusions from this particular set of data the mean and the standard deviation are by themselves almost useless and likely to be misleading. It would indeed be profitable, if possible, to evaluate statistically the chances of encountering an incubation period of less than 5 days or more than 22 days; but the author of the article has not seen fit to do this and I do not believe that he would have been justified in doing so in view of the small number of non-normal distribution of his cases.

Statistical methodology ought to be used as a means to understanding the universe and not as an esoteric device to fill the minds of the uninitiated with awe.

March 17, 1943.

ELBRIDGE SIBLEY, *Consultant, Division of Statistical Standards, Bureau of the Budget, Washington, D. C.*

REPORTS OF COMMITTEES

The By-Laws of the American Public Health Association provide that no standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council. Except where specifically noted to the contrary, the following reports are in the nature of progress reports from committees, most of which have had Section approval, but which have not been presented for Governing Council action, and therefore are not to be interpreted as standards approved by the American Public Health Association.

Report of the Archivist, 1942

Laboratory Section

THIS year your archivist reports first on the activities of the members of the Section as gleaned from the current literature.¹

Brigadier General Frederick F. Russell, U. S. Army, Medical Reserve Corps, received from the American Social Hygiene Association the William Freeman Snow award for distinguished service to humanity. The award was made in recognition of General Russell's work in organizing the syphilis and gonorrhea control program in the Army in the War of 1918, which was the basis of the present Army program. The two former recipients of this award were General Pershing and Surgeon General Thomas Parran of the U. S. Public Health Service. General Russell is also honored by the present generation of students in science. At George Washington University, Washington, D. C., there is the Smith-Reed-Russell Society, named in honor of Dr. Theobald Smith, Major Walter Reed, and General Russell, all former professors of bacteriology at this medical school.

Dr. George M. Sternberg, another charter member, is memorialized at the University of Michigan Medical School, where the Sternberg Medal was established in 1921. The medal is awarded annually to the student who has the

best record in the subject of preventive medicine.

Dr. Ludwig Hektoen and Dr. Joseph McFarland, two other charter members of the Section, received recent awards. To Dr. Hektoen was given the Distinguished Service Medal of the American Medical Association in recognition of the very great contributions he has made in many fields of science. Dr. McFarland, now Emeritus Professor of Pathology of the University of Pennsylvania School of Medicine, was presented the gold medal of the Strittmatter Award of the Philadelphia County Medical Society.

Brigadier General Raymond A. Kelser of the Army Veterinary Corps, and Chairman of the Standard Methods Committee on the Biology of the Laboratory Animal, received the award of the Twelfth International Veterinary Congress for distinguished service to veterinary science in the fight against livestock diseases. General Kelser's distinguished career in the Veterinary Corps dates back to the European War of 1918.

Dr. Jacob Geiger, San Francisco, received the blue ribbon and collar of the Order of Merit, Grade of Commander, of the Republic of Chile "for excellence of administration and research in solving public health problems."

Dr. Wilfred H. Kellogg, Chief of the Division of Laboratories of the California Department of Health, and credited with being the first man to make a bacteriologic diagnosis of plague in the United States, retired from his activities September 3, 1941. Dr. Kellogg was Chairman of the Laboratory Section 1934-1935.

Dr. Malcolm H. Soule, Professor of Bacteriology and Chairman of the Hygienic Laboratory at the University of Michigan, on leave of absence, acted as consultant to the Director of the Division of Health and Sanitation, Coördinator of Inter-American Affairs at the Pan American Sanitary Conference in Rio de Janeiro in September. He is remaining in South America until the end of November investigating the activities of the Division in that continent.

There is recorded with deep regret the death of the following members of the Section since the last report:

L. T. Clark, D.Sc.

Detroit, Mich. Elected Member 1919,
Elected Fellow 1931.

Carlos Manuel Garcia, M.D.

Habana, Cuba. Elected Member 1936.

Justus Goslau, M.D.

Cedar Grove, N. J. Elected Member 1938.

Clifford B. Line, D.V.M.

Lansing, Mich. Elected Member 1940.

Emerson Megrail, M.D.

Cleveland, Ohio. Elected Member 1919,
Elected Fellow 1924.

Joseph E. Pollard, M.D.

Newark, N. J. Elected Member 1924.

Last year a special plea was made for documents that have formed part of the official transactions of the Section and that should be preserved for official reference—a plea addressed in particular to the officers, committee members, and referees. Each official should leave a memorial of all the important proceedings that occur during his office. Obviously, the archives cannot be a depository for accumulated correspondence and records. Each contributor

should select the material of value in his possession and as it ceases to be in current use, deposit it; that is, convert it into archives as regularly as possible and thereafter leave it undisturbed. The Council took immediate cognizance of this situation by action aimed to facilitate the deposit of pertinent material, but since nothing has been received, it would seem that your archivist must begin a campaign to collect this material.

There is no occasion to make routine deposit of all published reports, but unpublished data, as, for example, record of the work of the Subcommittee on the Educational Qualifications of Laboratory Personnel and its report to the Association's main Committee on Professional Education, should be available in the archives.² Only in this way will the records of the objectives, policies, transactions, and achievements of the Section be preserved. Depositing original material of this character in the archives interferes in no way with the office of Secretary. Indeed, if there could be developed an awareness of the archival value of each transaction and a positive responsibility in each officer to contribute to this official record of the Section, the secretary's office would be freed for current administrative transactions.

War intensifies the need for safe depository. Thus, while archives are not historical notes drawn up for posterity, the Office of Archives might, in the present situation, well become the depository of material for future evaluation and disposition, in contrast to its traditional function of receiving only completed documents. The National Research Council has made fullest preparation for a "Medical History of the War" and the Subcommittee on Historical Records has urged that physicians "make a point of keeping diaries and of preserving materials which may ultimately be useful to the

history.”³ Members of the Laboratory Section have a definite obligation in this respect. There will be unusual opportunity on all fronts for new observations and for the trial and investigation of technics under new conditions. Certain of these wartime observations will have important peacetime applications. They will contribute, for example, to the Section’s volume *Diagnostic Procedures and Reagents*, which, as the report of the Executive Board of the Association stated last year, will “inevitably become the most representative source of experience and judgment.”⁴ Other records so collected would add measurably to the archives as evidence of the activities of members of the Section and might contribute, secondarily, to the “Medical History of the War.” I offer this suggestion to the Council and Referees for active consideration.

It was the intention last year to address each member of the Section for a record of activities and contributions to the national defense. This was deferred, but now with the formal action of War

it is important that the archives include a record of its members, in whatever capacity they may be serving. It is, therefore, proposed to canvass the entire membership in the hope of securing such a record.

The office of archives should be utilized by the membership. The contribution of the Section to the expanding fields of laboratory science can never be fully evaluated unless the members develop a responsible archival sense of their activities, and deposit record of them for the study of some future historian or research worker.

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AUGUSTUS B. WADSWORTH, M.D.

Report of the Chairman of the Coördinating Committee

Laboratory Section

ONCE more the chairman of the Coördinating Committee can only emphasize the essential adequacy of the reports of the various working committee chairmen.

It is noteworthy that with changing conditions resulting from our war effort there has been no lag in the recognition by our committees of the fundamental advances in our various fields of public health laboratory procedure.

At probably no other time in our national history have milk and dairy products been so well recognized for their important rôle in every phase of our economy. Their potentialities for both good and evil are almost universally recognized.

The work of our Committee on Standard Methods for the Examination of Dairy Products is thoroughly appreciated and recognized and its influence is constantly increasing. This fine result is due not only to the keen judgment and alertness of our *Chairman*, Dr. Robert Breed, but also to the success he has had in the selection of collaborators of the first rank.

It is no simple matter for any group to anticipate changes and be ready to meet new conditions which characterize the present era. The shortage of agar and the production of a type of phosphatase by thermophilic bacteria are but two of many developments our committee is well prepared to meet.

The large sales and the demand for a Spanish edition of our volume on Standard Methods are supporting evi-

dence for the truth of these statements. The decision to prepare merely a Spanish summary of the present report seems to be a wise one.

The Committee on Frozen Desserts, Dr. Friend Lee Mickle, *Chairman*, is working in close coöperation with the Dairy Products Committee.

The Water Committee is dealing with problems which are becoming more complicated day by day. With advances in our knowledge of water bacteria the *Chairman*, Dr. W. L. Mallmann, is charged with steering a safe course between pure science and practical sanitation.

The Committee on Diagnostic Procedures and Reagents has been enlarged by its *Chairman*, Dr. W. D. Stovall. This has been done for the purpose of making our volume more comprehensive. The job of selecting new referees has not been an easy one. It has been well done.

It is predicted that this committee's report has reached only the most preliminary stages of the recognition it is destined to receive.

Prior to this war the laboratory interests of even public health workers were restricted to a few chemical and bacteriological procedures. Even so, their willing dependence on their laboratories was far beyond that of the average practitioner of medicine. With the war our concern for methods of diagnosis have suddenly increased from reluctant toleration to an almost frantic demand for help. One of the reasons

for this is our broadened interest in diseases which up to now we have tucked away under the label "Tropical." Now that we have begun to think—and read with keener interest—about the history of cholera, plague, yellow fever, malaria, and typhus, we begin to wonder why we ever thought of them as tropical. We suddenly realize that they must not be placed among the things that are exclusively tropical—the things that cannot happen here—because they have happened here. And with restrictions which are becoming more necessary every day, no safe prediction can be made concerning our possible experience with them in the coming years.

The important point in this is that diagnosis of these conditions must have laboratory confirmation. Our medical schools have been criticised by government medical departments because doctors coming into the service know so little about the erroneously designated tropical diseases. A more serious type of unpreparedness is the lack of laboratories which have the trained personnel and the equipment to render the service required to recognize communicable and other morbid conditions which we practically neglected because we have thought of them as exotic.

The chairman of our committee is

well aware of our great needs in this emergency.

The Committee on Biological Products, Colonel Elliott S. Robinson, *Chairman*, has been alert during the year but active work has been restricted.

The *Chairman* of the Committee on the Biology of the Laboratory Animal, General R. A. Kelser, V.C., has been too much occupied by his official duties to do more than maintain interest in the work of his committee. One of his active Associate Referees, Dr. Paul A. Moody, University of Vermont, has prepared a progress report on the work of this committee.

An outstanding achievement of the Laboratory Section during the past year is the reestablishment of the Committee on Germicides and Other Deterrents of Bacterial Growth, under the Chairmanship of Dr. Stuart Mudd. Since his appointment, Dr. Mudd has been actively engaged in the selection of his referees and organization of the work of his committee. Since the products and procedures which will be studied by this committee are so much involved in our war effort it is predicted that the work will be facilitated rather than hindered.

A. PARKER HITCHENS, M.D.,
Chairman

Milk and Milk Products*

(Milk, Cream, Butter and Cheese)

Laboratory Section

DURING the year a special study has been started in an effort to bring about a better standardization of the methylene blue technic in routine control work. This has been undertaken by a subcommittee in preparation for a future edition of the Dairy Products Report. The subcommittee consists of C. A. Abele, *Chairman*, A. H. Robertson, H. R. Thornton, E. H. Parfitt, and W. D. Dotterer. C. K. Johns has been asked to make a comparative study of the resazurin tests and will report on his findings in the symposium (see April *Journal*, page 393).

Attention is being given to a standardization of methods for the examination of chocolate milk drinks and homogenized milk. C. C. Carson having been drawn into Army service, the work on methods of making sediment tests is being reorganized. Professor H. C. Olson has been appointed Referee for Methods of Examining Butter, and Dr. M. W. Yale, Associate Referee for Methods of Examining Cheese. Raoul F. Cowley of Cuba has been appointed a Referee, and Dr. A. de la Garza Brito is in process of being appointed a Referee to represent Cuba and Mexico, respectively. A. W. Fuchs has been asked to serve as a

Referee to assist in coordinating the standardization of laboratory and milk ordinance work.

We regret to report the death of one of the active and valuable members of the committee, W. S. Frisbie. W. A. Queen is being asked to serve as a Referee on Chemical Methods in his place.

Last year, Professor L. H. Burgwald was asked to make a survey of Laboratories to determine how many were utilizing the phosphatase test and which of the several tests in current use they had found to be the most useful. His report was given at Atlantic City in October, 1941, and later was published in the *Journal of Dairy Science*, 25:285-291, 1942. Separates were purchased and distributed to more than a thousand laboratories that use the A.P.H.A. Dairy Products Report.

ROBERT S. BREED, PH.D., *Chairman*
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* Report of the Standard Methods Committee on Milk and Milk Products.

STANDARD METHODS COMMITTEE ON EXAMINATION OF DAIRY PRODUCTS

Organized 1905. Reorganized 1933. Published reports: *Year Books*, 1934-1935, 1935-1936, 1936-1937, 1937-1938, 1938-1939, 1939-1940, 1940-1941. 8 volumes published: 1910, 1916, 1921, 1923, 1929, 1934, 1939, 1941.

Standard Methods for Dairy Products *

Laboratory Section

DURING the past year the sale of the 8th edition of *Standard Methods for the Examination of Dairy Products* has continued to be excellent. The original printing of 3,000 copies having been exhausted, 2,000 additional copies have been printed and are now available for sale. Recently a request has been made by Mexican members of the Association that a Spanish translation of this report be published. As this does not seem to be feasible, the committee in charge have under consideration the publication of a summary of the present report in Spanish. A

subcommittee composed of Dr. A. de la Garza Brito, Chairman; Dr. O. Costa-Mandry and Raoul Cowley has been appointed to care for this matter.

Because of the effective help given by them to the Joint Editorial Committee which had charge of the publication of the 8th edition, Dr. A. H. Robertson and Dr. S. R. Damon have been asked to study the present report, looking toward a condensation of the English text and a better coördination of the various sections of the report.

ROBERT S. BREED, PH.D., *Chairman*
A. PARKER HITCHENS, M.D.
F. LEE MICKLE, Sc.D.
H. T. SCOTT, PH.D.
E. M. BAILEY, PH.D. (for A.O.A.C.)

* Report of the Joint Editorial Committee for Standard Methods for the Examination of Milk and Milk Products.

Bacteriological Examination of Shellfish and Shellfish Waters*

Laboratory Section

INTRODUCTION

THE first edition of Standard Methods for the Bacteriological Examination of Shellfish was adopted in 1920 and printed in the *American Journal of Public Health* in 1922 (vol. 12, p. 574). In 1933 the late Professor Frederick P. Gorham suggested several minor changes (*A.J.P.H.*, vol. 23, pp. 56-57). However, no action was taken until 1935. At that time Dr. C. A. Perry was appointed referee under Dr. Robert S. Breed's Committee on Examination of Dairy and Food Products.

A questionnaire was sent to all interested persons, dealing with different aspects of a bacteriological procedure. The answers were carefully compiled and formed the basis of discussions held at the Army Medical School in Washington in April and November, 1935. In addition there was a symposium on shellfish at the Milwaukee Meeting of the American Public Health Association (1935) at which time the need for revision of existing bacteriological methods for the examination of shellfish was stressed. At this meeting an editor-in-chief of a proposed treatise on shellfish was appointed with a board of four to report on such aspects as (a) the economic importance and distribution of the shellfish industry in North America, (b) the biology of shellfish in relation to sanitation problems, (c) sanitary

surveys of production areas, (d) laboratory methods for use in the sanitary control of shellfish, (e) laboratory methods for use in the control of adulteration and decomposition of shellfish, (f) toxic products in mussels and their control, (g) epidemiology of shellfish epidemics, and (h) the nutritional value of shellfish. The plans, however, for a comprehensive report on shellfish have not yet been possible of attainment.

A new trial procedure for the bacteriological examination of shellfish was mimeographed and distributed during December, 1935. It was revised and redistributed to all concerned in July and again in December, 1938. Following the meeting of the committee at Ottawa, on June 17, 1940, another revision was issued in December, 1940, and again in July, 1941. The final revision was adopted at a joint meeting of the Laboratory and Sanitary Engineering Sections of the American Public Health Association at Atlantic City, on October 15, 1941.

The procedure has therefore undergone at least six revisions between 1935 and 1941. It represents considerable effort to meet the criticisms of various individuals and groups. Those responsible for the present method are under no delusion in regard to its technical limitations and it is fully realized that improvements and changes will follow further careful study.

Since the publication of the first

* Recommended Methods of Procedure. Report of the Standard Methods Committee to the Committee on Research and Standards.

standard method, dissatisfaction with its inadequacies in the practical sanitary control of the shellfish industry has been growing. It has become apparent from biological studies of shellfish and the shellfish-growing waters that special problems are involved. Under certain conditions it is desirable to make not only a quantitative estimate of the coliform bacteria but of the relative proportion of *Escherichia coli* present.

The examination of large numbers of water and shellfish samples makes it impractical to determine the presence of coliform bacteria as required in the latest edition of *Standard Methods of Water Analysis*. More rapid and economical procedures are desirable and, since there is no direct plating medium of practical value in estimating the numbers of coliform bacteria, the committee has recommended the estimation of the number of these organisms in the product from the results obtained by inoculating several tubes of medium with varying dilutions of the product on test. The Most Probable Number (M.P.N.) is considered mathematically more accurate and less likely to give erroneous interpretations than the "Score," and therefore tables for determining the M.P.N. have been included as the best method of expressing the results.

Two rapid methods of confirming the presence of *Escherichia coli* are recommended. The first requires plating out on eosin-methylene-blue agar (E.M.B.) and confirming on Koser's citrate medium. The second provides a transfer from the original positive lactose broth tubes to modified Eijkman lactose medium. Dodgson in England and Perry in this country have found the latter test of particular value in the practical control of the shellfish industry. Either method is sufficiently accurate to warrant practical use.

Both *Escherichia coli* and other coliform bacteria have been found unevenly distributed in the shell liquor, body and

intestine of oysters. It has seemed advisable, therefore, to use the entire oyster. A new method of cleansing and disinfecting the shells has also been introduced. Of particular importance is the examination of both shellfish and their growing waters in a comparable manner. Other changes will be noted.

The committee is deeply grateful to all those who have helped in the preparation of this procedure, for, without their criticism and advice, progress would have been impossible.

Shellfish Defined—The term "shellfish" as here used refers to oysters, soft-shell clams, quahaugs, and mussels.

Coliform Group—For the purpose of examination of shellfish and shellfish-growing waters, the *coliform group* shall be considered as including all organisms which, upon transfer from a positive presumptive test (gas positive in lactose broth), show fermentation with gas formation in lactose medium containing 0.00133 per cent of brilliant green and 2.0 per cent of bile (brilliant green lactose bile broth).

For the purpose of this report *Escherichia coli* shall be considered to be any member of this group which *in pure culture* fails to grow in Koser's citrate medium within 24 hours, or which shows definite gas formation in modified Eijkman medium incubated at 45.5° C.

I. BACTERIOLOGICAL EXAMINATION OF SHELLFISH-GROWING WATERS

Collection and Transportation of Sample

Samples of water from shellfish-growing areas should be collected at various stages of the tide and should also be collected at different depths if there is any indication of variations in salinity or pollution due to stratification. The samples should be collected in sterile bottles and should be fully protected against contamination both during sampling and after collection. They should be kept at a temperature at or below

10° C. (50° F.) and should be examined as soon as possible after collection. Every sample should *preferably* be tested within 12 hours from the time of collection and in no case should samples which have been held for more than 30 hours be tested.

Field Record

A record of environmental conditions made at the time of collection of the sample should accompany all water samples collected during the course of a survey to establish the sanitary condition of shellfish-growing waters. This record should include the following essential information:

Date and hour of collection
Exact location of the sampling station

Where possible the following supplementary data should be obtained in order to interpret the bacteriological findings:

1. State of the tide
2. Direction and velocity of currents
3. Direction and velocity of wind
4. Temperature and density of the water
5. Depth of the water and depth at which the sample was collected
6. Temperature of the air
7. Notes on any unusual conditions which may affect the sanitary quality of the water
8. Record of rainfall in the immediate past

A suitable form to be used for reporting this information may be found in the Appendix.

Procedure

Examinations for bacteria of the coliform group shall be made by primary inoculation into plain lactose broth (see Appendix) with incubation at 37° C. After incubation for not more than 48 hours definite gas formation shall be recognized by the presence of visible gas in the upper end of the inverted fermentation tube or by the presence of effervescent gas bubbles visible only when the tube is shaken.

1. Inoculate—

- a. Not less than 3 tubes with 10 ml. of undiluted water
- b. Not less than 3 tubes with 1 ml. of undiluted water
- c. Not less than 3 tubes with 1 ml. of a 1 in 10 dilution of water

(These dilutions may be altered to suit the degree of contamination of the water.)

Incubate tubes for 18–24 hours. Observe gas formation in each tube.

a. *Gas present*—Any amount of definite gas constitutes presumptive evidence of the presence of coliform bacteria and must be confirmed as described in step 2 below.

b. *No Gas*—Incubate negative tubes an additional 24 hours making a total of 48 hours' incubation. Observe gas formation.

1. Gas present in any amount constitutes a doubtful test which must always be confirmed (step 2).
2. Absence of any gas after 48 hours of incubation constitutes a final negative test.

Confirmation—A. Coliform Group

All positive gas tubes must be confirmed for bacteria of the coliform group.

2. Transfer a loopful (3 mm. diameter loop) of culture from the positive primary lactose broth fermentation tube to one of brilliant green lactose bile broth (see Appendix).

- a. Any amount of definite gas formation within 48 hours at 37° C. constitutes a positive test for bacteria of the coliform group.
- b. Absence of gas after 48 hours' incubation constitutes a negative test for bacteria of the coliform group.

B. *Escherichia coli*

Method I:

3. Inoculate eosin-methylene-blue (E. M.B.) agar plates (see Appendix) from positive lactose broth tubes which have

gas present. Incubate at 37° C. for 24 hours.

4. Inoculate tubes of Koser's citrate medium (see Appendix) with a bacteriological needle from several colonies suggestive of *Escherichia coli*. The greatest care should always be exercised to secure apparently pure cultures by using only well isolated colonies. Only a trace of the colony should be transferred, otherwise too much nutrient material may be provided. Incubate at 37° C.

Absence of growth after 24 hours constitutes a positive test for *Escherichia coli*.

Method II:

5. Inoculate tubes of modified Eijkman lactose medium (see Appendix) with a loopful of culture from primary lactose broth tubes which have gas present. Incubate at 45.5° C.

Any amount of definite gas formation within 48 hours constitutes a positive test for *Escherichia coli*.

Method III:

6. Complete all tests for *Escherichia coli* according to the recommended procedures in the appendix to the *Standard Methods of Water Analysis*.

II. BACTERIOLOGICAL EXAMINATION OF SHELLFISH

Collection and Transportation of Sample

In general, ten or more oysters, clams, or mussels judged to be representative of the lot and of the average size of the lot under examination, with deep bowls, short unbroken lips, and shells tightly closed, shall be selected and prepared for transportation to the laboratory.

Not less than ½ pint of shucked shellfish shall be collected for examination.

Shellfish selected as samples should be placed in a suitable sterilized container (such as a can with watertight lid or canvas bag) which shall be marked for identification. This same mark shall be

placed in its proper place on the descriptive form which accompanies the sample. All shellfish for bacteriological examination shall be handled aseptically.

Shellfish samples should be kept at or below 10° C. (50° F.) until examined, but under no condition should they be permitted to come in direct contact with ice.

A sample shall be considered unsatisfactory which has been improperly handled after collection. Samples of shell oysters should preferably be tested within 12 hours from the time of collection, and in no case should samples which have been held for more than 30 hours be tested. Samples of shucked oysters should be handled with special care and should, if at all possible, be analyzed within 4 hours after collection.

Field Record

A record of environmental conditions made at the time of collection of the sample should accompany all shellfish samples taken directly from growing waters. The record should include the following essential information:

Exact location and depth from which they were collected.

Date and hour of collection

Where possible the following supplementary data should be obtained:

1. State of tide
2. Temperature, and
3. Density of the water
4. Whether there has been heavy, moderate or very little rain during or immediately preceding the period of collection
5. Careful notes on any unusual sources of pollution such as boats, privies, sewers, pasture lands, animals, etc., which might affect bacteriological results

When samples are collected from packing plants or from the market, records shall be made of:

1. Date and hour of collection
2. Name and address of the place from which the samples were collected
3. Exact location of the water in which the shellfish were dug

4. Identification of the digger, shipper and reshipper, and the respective dates on which these transactions took place

5. Conditions of storage prior to collection of the sample

6. Sanitary conditions in the packing plant

7. Temperature at which shellfish were being held

Forms to be used for the submission of this data may be found in the Appendix.

Procedure

Preparation of Sample for Examination

1. Unopened Shellfish

a. Scrape off excessive growth and loose material from the shellfish and scrub with a stiff brush in running water of known purity until shells are clean and free of all mud, especially in crevices at junction of shells.

The hands of the examiner should be thoroughly washed with soap and water and the brush used for scrubbing the shells should be sterilized by boiling or autoclaving.

b. *Either* (1) immerse the scrubbed shellfish for 15 minutes in chlorinated water which will contain not less than 10 p.p.m. free chlorine at the end of treatment, as determined by the orthotolidine test and watch the shellfish during treatment and discard any which open and cause bubbling; rinse in water free of chlorine and of known purity, place on clean paper towels and dry in the air; *or* (2) place the clean shellfish on clean paper towels and dry in the air. Immediately before opening carefully flame the lip of the shellfish.

c. Open the shellfish with an oyster knife or other suitable instrument which has been sterilized by flaming or immersion for 3 minutes in boiling water. The point of the oyster knife can be inserted between the shells after some experience, or a small opening can be made with nibbling forceps. Cut the adductor muscle of the upper flat shell

if examining oysters and pry the shells apart just wide enough to drain off the shell liquor.

d. Drain off the shell liquor into a sterile bottle, then lay the oyster on a clean paper towel and pry the shell loose at the hinge. By holding the lower (deep bowl) shell down with the oyster knife and using the knife at the same time as a lever to pry open the upper shell, the anterior edge may be grasped with the left hand and removed with the minimum chance of contamination. The removal of the shell is the most difficult part of the procedure and calls for careful technic to avoid shell liquor running on the hands, and contamination of the shellfish.

e. Cut the body of the shellfish into approximately 10 equal pieces with scissors or oyster knife,* previously sterilized by autoclaving, flaming, or immersion in boiling water for 3 minutes, and empty into the bottle containing the shell liquor. This bottle should be a heavy-walled glass or rubber-stoppered bottle graduated at 200 ml. and 400 ml. Not less than 200 ml. of shellfish with the shell liquor should be used but, in no case, should less than 6 shellfish constitute the sample.

f. Add about a tablespoonful of sterile 5 mm. imperforate glass beads to the sample and shake vigorously 50 times, each shake being an up and down excursion of about 1 foot, time interval not exceeding 30 seconds.

g. To 200 ml. of this well mixed sample, add 200 ml. of sterile distilled water. Shake vigorously to mix the sample.

* A number of laboratories at the present time are using a mechanical disintegrator for the preparation of the shellfish samples. The committee has purposely omitted this procedure from the "Standard Methods" pending a study and standardization of available equipment. There may be considerable difficulty in obtaining this special equipment, due to the emergency. Laboratories having such equipment could make a valuable contribution for future standard methods by conducting comparative studies.

Allow the sample to settle for 2 minutes.

2. Shellfish Removed from the Shell

The examination of shucked shellfish shall be made in an analogous manner to that for shell stock, that is, 200 ml. of the sample (both shellfish and liquor) shall be added to 200 ml. of sterile distilled water after the bodies of the shellfish have been cut up as in step (e) above.

Examination for members of the Coliform Group and Escherichia coli

Examination of shellfish shall be made in a manner similar to that used for the examination of shellfish water samples.

1. Presumptive Test:

Using plain lactose broth fermentation tubes, inoculate:

a. Each of 5 tubes with 2 ml. (1 ml. of composite shellfish sample) from sample as prepared under section A.

b. Each of 5 tubes with 1 ml. from a 1 in 10 dilution of the composite sample (2 ml. prepared Sample A plus 8 ml. of sterile distilled water); and

c. Each of 5 tubes with 1 ml. from a 1 in 100 dilution of the composite shellfish sample (1 ml. of 1 in 10 dilution plus 9 ml. of sterile distilled water).

If desired, further decimal dilutions may be carried out. Incubate at 37° C. for a total of 48 hours. Examine after 24 and 48 hours for the presence of gas in the tubes.

The presence of gas in any amount, or the appearance of effervescent gas on shaking a tube, shall constitute a positive presumptive test; the absence of gas, a negative presumptive test.

2. Confirmation—A. Coliform Group

All positive tubes must be confirmed for bacteria of the coliform group, as described under Section 2, under "Coliform Group," in the procedure for the

examination of shellfish waters, by transfer to brilliant green lactose bile broth.

B. *Escherichia coli*

Confirmation for *Escherichia coli* shall be made by either of the two methods described under Sections 3, 4, and 5, under "*Escherichia coli*," in the procedure for the examination of shellfish waters, that is, *either* by transfer from the primary lactose broth tubes to E.M.B. plates and further identification in Koser's citrate medium, *or* by transfer to modified Eijkman lactose medium at 45.5° C. Any laboratory charged with the responsibility of examining samples of shellfish other than those known to have been freshly taken directly from growing areas would be well advised to complete all tests for *Escherichia coli* according to the procedure recommended in the appendix to the *Standard Methods of Water Analysis*. Such examinations may become the basis of legal action and shortcuts are not recommended.

C. Colony Counts

A standard colony count of shellfish samples has been found to be of value as an index of general sanitation and refrigeration.

Colony counts shall be made by inoculating various amounts of sample, as prepared under "Technical Procedure—A," above, into tryptone-glucose-extract-agar (see Appendix) and incubating plates at 37° C. for 48 hours.

The method of preparing plates and making the counts shall be that recommended by the American Public Health Association as a standard method for the examination of dairy products, except that milk shall not be added to the medium (*Standard Methods for the Examination of Dairy Products*, Seventh Edition, 1939).

Collected by

tube with proper precautions for preserving its sterility, and sterilize at 100° C. for 30 min.

It is permissible to add by means of a sterile pipette directly to a tube of sterile nutrient broth enough of the lactose solution to make the required 0.5 per cent concentration. The tubes so made shall be incubated at 37° C. for 24 hrs. as a test for sterility before they are used.

2. *Eosin-Methylene-Blue Agar (E.M.B. Agar):*

| | | |
|---|----------|----------------------------------|
| Peptone | 10.0 gm. | } Certified for culture media |
| Dipotassium phosphate (K_2HPO_4) anhydrous.. | 2.0 gm. | |
| Agar | 15.0 gm. | |
| Lactose | 10.0 gm. | |
| Eosin Y, yellowish (2% aq. sol.) | 20.0 ml. | |
| Methylene Blue (0.5% aq. sol.) | 20.0 ml. | |
| Water (distilled) to make 1,000 ml. | | |
| No adjustment of the reaction is necessary. | | |
| Sterilize in the autoclave at 15 lb. for 15 min. (121° C.) | | |

3. *Brilliant Green Lactose Bile Broth* (2 per cent):

Dissolve 10 gm. of peptone and 10 gm. of lactose in not more than 500 ml. of distilled water. Add 200 ml. of fresh ox bile or 20 gm. of dehydrated ox bile dissolved in 200 ml. of distilled water. No dehydrated ox bile shall be used which has a pH of less than 7.0. Make up with distilled water to a total of at least 975 ml. and adjust the reaction to pH 7.4. Add 13.3 ml. of a 0.1 per cent solution of brilliant green (certified for culture media) in water; make up to a total of 1,000 ml. and filter through cotton.

Distribute the medium in tubes provided with inverted vials. Sterilize in the autoclave at 15 lb. for 15 min. (121° C.).

The reaction after sterilization shall not be less than pH 7.1 and shall not be more than pH 7.4.

4. *Koser Citrate Medium:*

| | |
|---|-------------|
| Sodium ammonium phosphate (micro-cosmic salt) | 1.5 gm. |
| Potassium dihydrogen phosphate (anhydrous) | 1.0 gm. |
| Magnesium sulfate | 0.2 gm. |
| Sodium citrate (crystals) | 3.0 gm. |
| Water (distilled) | 1,000.0 ml. |
| Sterilize in the autoclave at 15 lb. for 15 min. (121° C.) | |

5. *Tryptone-Glucose-Extract-Agar with* *1 per cent Sodium Chloride:*

| | |
|--|--------------|
| Agar, best quality, not oven dried.... | 1.5 per cent |
| Beef extract | 0.3 per cent |
| Tryptone | 0.5 per cent |
| Glucose | 0.1 per cent |
| Sodium Chloride | 1.0 per cent |
| Reaction—pH 6.6 to 7.0 | |

The above media may be purchased in dehydrated form from firms of known reliability. The preparation of these media should conform to directions given above. Dehydrated media are recommended in the case of Eosin-Methylene-Blue Agar and Brilliant Green Lactose Bile Broth.

Large laboratories obliged to make their own media would be well advised to run comparative tests from time to time, using one of these well known commercial dehydrated products for the comparison.

MODIFIED EIJKMAN TEST

Eijkman Lactose Medium:

It is recommended that the dehydrated medium manufactured by the Difco Laboratories, Inc., be used whenever possible since this should insure use of a medium of correct composition and affords an easy and economical method of preparation. The formula is given below:

| | |
|----------------------------|-------------|
| Lactose | 3.0 gm. |
| Tryptose | 15.0 gm. |
| K_2HPO_4 anhydrous | 4.0 gm. |
| KH_2PO_4 anhydrous | 1.5 gm. |
| NaCl | 5.0 gm. |
| Distilled water | 1,000.0 ml. |

The ingredients are heated until dissolved and sterilized at 15 lb. (pure steam) for 15 min. (121° C.).

DESCRIPTIVE DATA—SHELLFISH SAMPLES FROM GROWING AREAS

Identification No. Date collected..... Time

Bay Bed

Location

Town County State

Type of shellfish

Condition of tide ... Water Temp. Sp. Gr. Depth

Rainfall during last 48 hrs.

Sources of pollution

Make careful notes on boats, weather, towns, privies, sewers,
pasture lands, etc., which might be sources of pollution.

Collected by

A SUITABLE FORM FOR REPORTING FINDINGS

The concentration of ingredients should be constant, hence it is necessary to use medium of different concentrations depending on the amount of inoculum to be added. For use as a confirmatory medium with inoculation of a loopful of culture from primary lactose broth tubes, the proper concentration is that given in the first line of Table 1.

DESCRIPTIVE DATA—SHELLFISH SAMPLES—FROM PACKING PLANTS OR MARKETS

Identification No..... Date collected..... Time

Place..... No.....

Type of Shellfish.....

Collected from

Bed No. Bay..... Owned by.....

Date taken..... Dug by..... No.

Shipped by..... No. Date

Reshipped by..... No. Date.....

Was the shellfish stored under proper sanitary conditions.....

Was the shellfish properly refrigerated..... Temperature.....

Are there any other possible causes of contamination.....

Was the sample collected from a previously unopened container.....

Notes:

Collected by.....

A SUITABLE FORM FOR REPORTING FINDINGS

TABLE 1

| Amount of Inoculum Used | Use Indicated Amount of Dehydrated Me- dium per Liter of Distilled Water for Proper Strength | Amount of Medium to a Tube | Convenient Size (mm.) Durham Fermentation Tubes | |
|----------------------------|---|-------------------------------|--|------------|
| | | | Outer Tube | Inner Tube |
| 0.1 ml. or less | 28.5 gm. | 5 ml. | 13 x 100 | 5 x 50 |
| 1.0 ml. | 34.2 gm. | 5 ml. | 13 x 100 | 5 x 50 |
| 2.0 ml. | 40.0 gm. | 5 ml. | 13 x 100 | 5 x 50 |
| 10.0 ml. | 57.0 gm. | 10 ml. | 18 x 150 | 10 x 50 |

Incubation

Incubation at $45.5^{\circ} \pm 0.2^{\circ}$ C. for selective growth of *Escherichia coli* from other coliform bacteria, unlike incubation at 37° C. must be closely controlled. Below 45° C. other bacteria of the coliform group than *Escherichia coli* will grow while temperatures above 46° C. will inhibit *Escherichia coli*.

Because of the small optimum range of temperature, incubator thermometers must be carefully checked against a certified or standard thermometer and a regulator used which is sensitive to at least 0.1° C.

Only a good water-jacketed incubator, with outside wall insulation and preheated air, should be used. Temperature variations at various points in such an incubator have not been found to

vary sufficiently to interfere with the test. Fermentation tubes require from 1 hr. to $1\frac{1}{2}$ hrs. for the temperature of the broth to rise from that of the room to that of the incubator. This temperature lag is desirable as it apparently permits any *Escherichia coli* present to adjust themselves to growth at 45.5° C. Wire racks which separate the fermentation tubes have been found preferable to others. Wooden racks insulate the tubes and are not satisfactory.

JAMES GIBBARD, *Chairman*

C. T. BUTTERFIELD

HAZEL M. HATFIELD, M.D.

A. PARKER HITCHENS, M.D.

A. C. HUNTER, PH.D.

C. B. KELLY, JR.

C. A. PERRY, Sc.D.

F. W. TANNER, PH.D.

Examination of Water and Sewage*

Laboratory Section

WORK on the proposed new edition of *Standard Methods for the Examination of Water and Sewage* shows considerable progress. Copy has been completed for the sections on: Sewage, Sewage Effluents, Industrial Wastes, and Polluted Waters.

Examination of Sewage Sludges and Muds
Microscopical Examination of Water
Microscopical Examination of Sewage
Sludge and Bottom Sediments
Bacteriological Examination of Water

Work is in progress on:

Sanitary Examination of Water—Physical
and Chemical
Mineral Examination of Water

Unless unforeseen developments arise, the complete manuscript will be ready for presentation in 1943.

Progress has been slow because of the fact that many members of the committee have other activities that must be handled as a result of the war.

It is urgent that a new edition be published soon to prevent the standards from becoming obsolete. A standard procedure should always be abreast of the times to be useful. New techniques and methods of analysis are constantly appearing in the literature. New acceptable procedures should be adopted as standard procedure as soon as the methods have been fully proved. Unless editions are frequent, incorporating new proven procedure, the purpose and function of a standard procedure is lost.

The proposed changes in procedures were presented in last year's report. No additional changes are anticipated.

W. L. MALLMANN, PH.D., *Chairman*

MAC H. MCCRADY

A. M. BURWELL, PH.D.

F. WELLINGTON GILCREAS

LELAND W. PARR, PH.D.

THEODORE A. OLSON

M. STARR NICHOLS, PH.D.

S. T. POWELL

* Report of the Standard Methods Committee.

STANDARD METHODS COMMITTEE ON EXAMINATION OF WATER AND SEWAGE

Organized 1899. Reorganized 1933. Published reports: *Year Books* 1930-1931, 1934-1935, 1935-1936, 1937-1938, 1939-1940, 1941-1942. 8 volumes published: 1905, 1912, 1917, 1920, 1923, 1925, 1933, 1936.

Examination of Frozen Desserts and Ingredients*

Laboratory and Food and Nutrition Sections

A REPORT on the activities and accomplishments of this committee has been published in the *Year Book* each year beginning with 1937-1938.

Although 1941-1942 has been one of the busiest and most productive years since the committee was organized in 1936, it is possible to summarize the work very briefly. No meeting of the committee was held during the year but a meeting has been held during this Annual Meeting at which the work of the committee, particularly that of the referee for chemical methods, has been reviewed and plans have been made for the future.

In the last Annual Report it was stated that three proposed methods had been prepared by his associate referees for Dr. J. H. Shrader, Referee for Chemical Methods; that these methods had been studied and criticised by several chemists; that they were being presented at that time to the Coördinating Committee on Standard Methods. With the approval of the Coördinating Committee those methods were mimeographed early this year and have been widely distributed for criticism and comment. These methods are:

Accurate Sampling for the Determination of Milk Fat of Ice Creams Containing Insoluble Particles, Such as Fruits, Nuts, and Crumbs of Pastry, Etc., by P. H. Tracy.

Determination of Milk Fat in Ice Cream and Ice Cream Mix by a Modified Babcock Technic, by W. H. Martin.

Detection of Stabilizers in Frozen Desserts, by F. L. Hart.

It was mentioned at the time of that report that other work by associate referees working under Dr. Shrader was in progress. Shortly after the 1941 Annual Meeting the committee was able to add a fourth proposed method to those already presented to the Coördinating Committee. That method was:

Determination of Per cent Overrun in Ice Cream, by P. S. Lucas.

During the year all the fundamental studies on these methods have been completed and the methods have had a wide circulation not only among members of this Association but among members of the Association of Official Agricultural Chemists, International Milk Dealers Association, International Ice Cream Manufacturers Association, Dairy Science Association, and International Association of Milk Sanitarians, and particularly among members of committees of those associations. A surprisingly large amount of comment and criticism has been received. It seemed desirable in the light of the suggestions offered that the methods be revised, and in some instances practically rewritten with changes in titling. This has been done by Dr. Shrader, and the revised methods have been considered by the committee at this Annual Meeting. Recommendations regarding them are being made to the Coördinating Committee. It was voted by the committee

* Report of the Joint Standard Methods Committee.

that the revised methods in their present form be included as supplements to this committee report so that they will be published during 1943 as "Proposed Methods" of the committee; it was also voted that they be again submitted to all interested persons in reprint form in order that criticism and comment on them may be secured by the committee while they are still in the form of "Proposed Methods."

In the last report of this committee it was stated that other work in progress by associate referees working under Dr. Shrader included the development of: (1) A modified method for the phosphatase test to apply it to frozen desserts, (2) a method for the determination of milk solids in frozen desserts, (3) a procedure for the determination of acidity of frozen desserts. It was also mentioned that a study of a method for the determination of saccharin in frozen desserts was under consideration but that no associate referee had been assigned to that project. The referee has nothing further as yet to report on these projects.

Methods have been completed for the bacterial analysis of all ingredients entering into the manufacture of frozen desserts except the stabilizers. Work is progressing on them but they present some difficult problems due to the insolubility of certain stabilizers except at temperatures above which most bacteria are killed. No new methods have been proposed during the year by any of the other referees.

Some criticism and comment has been received of the bacteriological methods that were published in the 8th Edition of *Standard Methods for the Examination of Dairy Products*. It had been expected that criticism would be forth-

coming since that was the first edition of *Standard Methods* to contain methods for the examination of the ingredients used in frozen desserts. Careful consideration has been given to those comments; as a result the bacteriological referees are considering rewriting those methods in a different form expecting that they will be much more usable when reprinted in the next edition. It is quite likely, for example, that all of the methods for the detection of special bacterial groups or species in milk and in dairy products will be assembled in one chapter in the next edition of *Standard Methods*.

Since the work of the committee is still in progress, it is requested that the committee be continued.

FRIEND LEE MICKLE, Sc.D.,
*Chairman, Joint Committee
Representatives from the Laboratory
Section*

FRIEND LEE MICKLE, Sc.D.,
Chairman

JAMES A. GIBBARD
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M. J. PRUCHA, Ph.D.
E. C. THOMPSON, Ph.D.
P. H. TRACY, Ph.D.

Preparation of Samples of Frozen Desserts Containing Insoluble Particles Such as Fruits, Nuts, Pastries

PROPOSED METHOD

The presence of insoluble particles of fruits, nuts, and crumbs of pastries interferes with pipetting of melted samples of ice cream for the determination of the fat. Some laboratories strain these out, some macerate them, and many neglect to test these products. Such products can be made smooth, homogeneous, and uniform by comminuting them in a malted milk mixer or similar device.*

I. Application and Limitations

When this procedure has been followed, the fat in the comminuted ingredients will be included in the fat determinations so that a determination of total fat rather than of milk fat is obtained. This procedure is analogous to the inclusion of cocoa fat commonly

encountered in the determination of fat in chocolate ice cream.

This procedure is not applicable in those communities where laws or regulations permit lower milk fat content in ice cream to which ingredients of an insoluble nature have been added.

II. Determination

Fill the mixer not more than one-third full with the melted sample. This requires 4–5 oz. by weight of sample. Operate the mixer until the insoluble particles are broken down into a finely divided state. The soft fruits are quickly comminuted. The harder products must be treated longer to secure the desired breakup.

To prevent churning, warm the sample above the melting point of the fat (to about 40° C. or 104° F.) before comminuting. Samples from properly homogenized mixes do not churn out. Cool the comminuted samples and collect in 400 ml. beakers.

They are now in condition for pipetting for the examination for the fat.

M. J. PRUCHA, PH.D.

* Suitable mixers equipped with large motors can be secured from the following:

Malted milk mixer:

The Stevens Electric Co., Racine, Wis.

The Bersted Manufacturing Co., Chicago, Ill.

Waring Blender:

Central Scientific Co., Cambridge A., Boston, Mass.

The Redman Scientific Co., San Francisco, Calif.

Hollywood Liquefier:

The Hollywood Liquefier Corp., Los Angeles, Calif.

Determination of Per cent Overrun in Frozen Desserts

PROPOSED METHOD

The amount of air whipped into frozen desserts by the freezing process is commonly expressed as the percentage of overrun. In general, it is calculated from measurements of the volume and weight of the sample of frozen dessert in ratio to comparable measurements of the volume and weight of the mix.

I. Application and Limitation

For the proper regulation of overrun, both bulk and packaged frozen desserts must be examined. Public health and other regulatory laboratories are ordinarily interested in determining the amount of food solids per gallon in the final product which may be reduced

below the legal standard when overrun is not carefully controlled.

It is an accepted procedure to consider the weight and the volume of the melted, de-aerated frozen dessert as the weight and volume, respectively, of mix from which the frozen dessert has been made. However, the volume of the melt may contain variable and unknown amounts of air, tenaciously held by the stabilizer even after long heating, thus making the volume of the melt greater than that of the original mix. In such cases, the overrun calculation will give too low a figure.

II. Sampling

Select packaged samples in the original unbroken package directly from the hardening room of the manufacturing plant or in the storage cabinet of the dealer; immediately store them in an insulated container with dry ice, and hold them frozen in the container until they are examined in the laboratory. Optionally, an equivalent refrigeration practice may be followed.

In sampling bulk frozen dessert certain determinations must be made in the field. First weigh the original container, usually of 1, 2½, or 5 gal. capacity, together with its contents. (If the weight is less than 15 lbs., the scale used should have a tolerance no greater than ⅜ oz.; if the weight is between 15 and 50 lbs., the tolerance should not exceed ¾ oz.) If the weight of the container is not already known, remove the contents and determine the weight of the dry, empty container. (The contents should be handled in a sanitary manner so that they may be returned to a subsequent batch of mix for re-freezing.) The difference between these two weighings is the net weight of the given volume of frozen dessert.

Record the net weight of the frozen dessert that was in the container and the capacity of that container on the information sheet submitted with the

sample. Then place a sample* of no less than 8 oz. in a stoppered bottle to be taken or shipped to the laboratory.

III. Determination

A. Volume of Frozen Dessert—

To determine the volume of packaged frozen desserts follow one of the three procedures given below. The determination of volume of bulk frozen desserts has been made in the field as specified above.

1. Determine the capacity of the container up to the level of the fill of the contents by measuring the dimensions of the container; if cylindrical, the measurement should include the inside diameter and the depth from the level of the fill; if tapering, measure the diameter at the level of the fill and at the bottom, using the mean of these measurements as the average (mid) diameter. Calculate the volume from the formula

$$\text{Volume} = \pi r^2 h$$

where π is 3.1416, r is the radius, and h is the height.

2. A quicker way to determine the volume is to fill the container with water at 20° C. (68° F.) up to the level of the fill, and then measure this volume of water. In case it is not practical to empty the original container, measure the volume of several similar containers to the same fill, and average their volumes.

3. The volume of a wrapped slice or brick of frozen dessert can be calculated from its measured dimensions.

B. Weight of frozen dessert—

1. Weigh † the product the volume of which has been determined.

* The Bureau of Dairy Service, California Department of Agriculture, Sacramento, recommends the following sampling procedure: The sample of the frozen dessert is taken with a sterilized spatula and put into a 2 oz. bottle fitted with an aluminum screw cap which is sealed with a single service, removable, inner gasket of pulp board. The samples are packed in a case called a "Davis Pie Cover," which is 11 in. deep by 10¼ in. diameter, accommodating two layers of 2 oz. bottles, 27 to the layer. Two frozen brine pads are placed in the bottom of the case, and one on top. These pads are usually frozen in ice cream hardening rooms. If the brine pads are frozen solid, the samples will remain frozen for 24 hours, even under warm weather conditions. The cases are obtainable from A. E. Warwick Co., 15 Pierce St., Reading, Mass., \$16 each. The brine pads known as "Round Zero Packs," are obtainable from Waltham System, Inc., 277 Military Road, Buffalo, N. Y.

† See note on next page.

2. In the case of wrapped slices or bricks, weigh* the frozen dessert in its immediate container or carton. Remove all traces of product from the container, dry the container thoroughly, and weigh it. The difference in the two weights represents the net weight of the frozen dessert.

C. Volume and weight of mix from melted frozen dessert—

Weigh about 130 gm. of well mixed frozen

* For these weights, a Harvard trip balance, capacity 2 kilograms, sensitive to 0.1 gram, can be used.

dessert (weighed accurately to the nearest centigram) into a tared 250 ml. volumetric flask. (A 250 ml. sugar flask is convenient because of its wider neck.) Heat contents to 50° C. (120° F.) for 3 minutes to expel air. Add 10 gm. of n-amyl alcohol, sp. gr. 0.817/20° C., or capryl alcohol, sp. gr. 0.827/20° C., to break the foam. Adjust temperature of contents to 20° C. (68° F.). Fill flask to mark with distilled water at 20° C. (68° F.). Dry outside of flask and weigh.

Calculate the volume of this known weight of mix (i.e., melted and de-aerated frozen dessert) as follows:

$$(a) \text{ (weight of contents of 250 ml. flask) } - \text{ (weight of frozen dessert + amyl alcohol) } = \text{ gm. water added}$$

$$(b) \frac{\text{gm. water}}{0.998} = \text{ml. water}$$

$$(c) 250 \text{ ml.} - (\text{ml. water} + 12.24 \text{ ml. amyl alcohol}) = \text{ml. mix}$$

$$(d) \frac{\text{gm. mix}}{\text{ml. mix}} = \text{density of mix}$$

The weight of any volume of mix equals its density times its volume.

D. Calculation of overrun—

$$\frac{(\text{wt. unit volume of mix}) - (\text{wt. same volume of frozen dessert})}{(\text{wt. same volume of frozen dessert})} \times 100 = \text{Percentage overrun}$$

NOTE: 1,000 gm. = 2.205 lbs.
3,785.43 ml. = 1 gal.

P. S. LUCAS

Modified Babcock Technic for Milk Fat in Frozen Desserts

PROPOSED METHOD

I. Applications and Limitations

The need for a rapid sorting test in regulatory practice to indicate those samples of frozen desserts which need more detailed examination has led to numerous attempts to devise a modification of the relatively quick and cheap Babcock method. None of the modifications of the Babcock procedure has

received general acceptance. They are not accurate enough for court cases. However, they are so much quicker and cheaper than the official Roesse-Gottlieb method that they are used by many regulatory officials to analyze far more samples than could be handled only by the official method. The so-called Minnesota modification¹ is the one most

widely used and is proposed here.* Any samples showing low fat content by this method should be run by the official Roesse-Gottlieb method.

II. Apparatus and Reagents

Apparatus:

1. Cream weighing scales—described under Part IV, B, XXV, p. 250†
2. Centrifuge, Babcock type
3. Dividers or other reading device
4. Test bottles, 20% ice cream
5. Water bath with rack

Reagents:

1. Sodium salicylate
2. Potassium carbonate
3. Sodium hydroxide
4. Isopropyl alcohol‡
5. Glymol or other colored "reading" solution

The first four chemicals listed are used to make the reagent,** which may be made as follows: To a mixture of 645 gm. sodium salicylate, 355 gm. potassium carbonate, and 165 gm. sodium hydroxide add 3 liters of water. After the chemicals have dissolved, add 1 liter isopropyl alcohol. Store in cork or rubber-stoppered glass bottles.

III. Sampling

Sample frozen ice cream from the container or can by removing about $\frac{1}{2}$ –1 in. of the upper surface and taking the sample from the freshly uncovered lower layer. Sample wrapped, sliced ice cream by removing the wrapper from any slice which is representative of the total volume. Samples of stick ice

cream are obtained by trimming off outer chocolate or other coating. Ice cream mix is sampled from a storage vat after thorough agitation or from a can after thorough stirring.

Melt the frozen product in a water bath (temperature about 38° C. or 100° F.), by long storage at 5–10° C. (40–50° F.) or at room temperature. Keep the sample covered during the melting to prevent evaporation of water from the sample. Thoroughly mix the melted sample or liquid mix by pouring back and forth from one container to another just before it is weighed into the test bottles. Use care to incorporate any accumulated foam layer.¹

IV. Determination

Preferably run each determination in duplicate. Weigh 9 gm. of prepared sample into a 20 per cent ice cream test bottle. Add 15 ml. of the reagent. Shake thoroughly. Digest for 12–15 minutes in a gently boiling water bath, having the bottles in a rack held at least $2\frac{1}{2}$ in. above the bottom of the bath. Shake the mixture in the test bottle vigorously at the time when at least half the contents of the bottle have turned dark brown (usually about $2\frac{1}{2}$ minutes after placing them in the water bath). Shake vigorously again about 1 minute later. Some care may be necessary when starting to shake the bottles the second time, as the isopropyl alcohol in the reagent may boil off through the neck of the bottle, taking with it some of the mixture.

Centrifuge the test bottles for $\frac{1}{2}$ minute at the speed used for the regular Babcock test. Add hot water (55–65° C. or 130–150° F.) to float the milk fat well up into the neck of the test bottle. Centrifuge for $\frac{1}{2}$ minute. Place the test bottles in a water bath at 55–60° C. or 130–140° F. and leave for 5 minutes only, because prolonged contact may entail loss of fat by saponification.

Tests may be read with the use of a

* The so-called Minnesota modification and the so-called Pennsylvania method (*Pennsylvania State College Agr. Exp. Sta. Bull.* 412, 1941) have both been reported favorably, particularly the latter, for chocolate ice cream. Both received such favorable commendation that tentative decision to adopt the Minnesota test rests upon its greater use (as determined by circularized questionnaire and comments by collaborating laboratories). Further studies are being made on the usefulness of the two methods. The slightly preferred one is presented herewith to get the work started and to secure a volume of constructive comment.

† References in this style refer to *Standard Methods for the Examination of Dairy Products*, 8th Ed., 1941.

‡ This reagent may be purchased under name of Petronol, Isopropanol, etc.

** The prepared stable reagent may be purchased from the Kimble Glassware Co., Vineland, N. J.

colored reading fluid such as glymol, or a reading may be taken from the bottom of the upper meniscus to the bottom of the lower meniscus. If a colored reading fluid is used, immediately before reading each test allow just a few drops of the fluid to flow gently down the inside of the neck of the bottle; the liquid must not be dropped onto the surface of the fat column. Hold the bottles in a level position and read as one would read a Babcock cream test, measuring from the bottom of the lower meniscus to the sharp line of demarcation between the glymol and the fat. To secure

accurate readings, apply divider points to the smooth side of the bottle neck using care to prevent slipping of lower point of divider. When adjusting the lower point of the dividers, keep the eyes on a level with that point; and when adjusting the upper point, raise the eye accordingly. Report the average of the duplicate determinations.

REFERENCES

1. Petersen, W. E., and Herried, E. O. *Minnesota Agr. Exp. Sta. Tech. Bull.* 63, 1929.
2. Johnson, J. J., and Ormond, J. I. *J. Dairy Sci.*, 20:159, 1937.

W. H. MARTIN

Detection of Stabilizers in Frozen Desserts

PROPOSED METHOD

Frozen desserts may contain gelatin, gums, sodium alginate, or a mixture of any of these stabilizers. Sherbets or ices may contain pectin, or any of the foregoing products.

I. Application and Limitations

Sodium alginate differs from the true gums in that a precipitate of alginic acid is formed by the addition of trichloroacetic acid. Trichloroacetic acid cannot be used to separate sodium alginate from proteins because it precipitates both proteins and alginic acid. Tannic acid precipitates only the proteins, including gelatin, leaving the gums, including the alginates, in solution.

The proposed method involves: (1) Differential treatment with trichloroacetic acid to remove proteins and sodium alginate and treatment with tannic acid to remove proteins; (2) addition of alcohol to the filtrates to precipitate gums and any remaining alginates; (3) confirmation with special reagents.

This method does not detect pectin in sherbet. It does not tell definitely whether gelatin is present. Methods¹

for the detection of gelatin in milk which can be used on frozen desserts with little modification have been published by the Association of Official Agricultural Chemists.

II. Apparatus and Reagents

Apparatus:

1. Beakers, 150 ml.
2. Bottles, 8 oz.*
3. Casseroles, 500 ml.
4. Centrifuge
5. Centrifuge tubes, conical, 50 ml.
6. Cream weighing scales, sensitivity 30 mg. (Part IV, B, XXV, p. 250.)†
7. Evaporating dishes
8. Filter paper, Whatman 41H
9. Pipette guard ‡
10. Pipettes
11. Water bath

* Some laboratories use 8 oz. nursing bottles.

† References in this style refer to *Standard Methods for the Examination of Dairy Products*, 8th Ed., 1941.

‡ The problem of pipetting the lower liquid portion of a centrifuged mixture without contamination from the top layer is facilitated by the use of a pipette guard, called a Vohale tube. (Hart, F. L., *J. Assoc. Offic. Agri. Chem.*, 20:529, 1937.)

This device consists of a wide-bore glass tube, flared slightly at the upper end and fitted at the lower end with a ground-glass cap, over-all length about ½ in. less than that of the centrifuge bottle. The

(Cont. on next page)

Reagents:

1. Acetic acid, glacial
2. Trichloroacetic acid, 50% w/v
3. Hydrochloric acid, concentrated
4. Tannic acid, 20%
5. Sodium hydroxide, approximately 2N solution
6. Alcohol, ethyl, 95% and 80%
7. Benedict's reagent, qualitative:

Prepare Benedict's reagent as follows: Dissolve 17.3 gm. sodium citrate and 10 gm. anhydrous sodium carbonate in about 80 ml. hot water; dissolve 1.73 gm. crystalline copper sulfate in 10 ml. water. Filter the alkaline citrate solution, add the copper sulfate solution slowly, with constant stirring, and make up to 100 ml.

8. Phloroglucinol
For Tollen's test ²

III. Sampling

Sample frozen ice cream from the container or can by removing about 1/2-1 in. of the upper surface and taking the sample from the freshly uncovered lower layer. Sample ice cream mix from a storage vat after thorough agitation or from a can after thorough stirring. Remove the coating from on-the-stick samples and use all the remainder. For samples from small packages, remove about 1/4 in. of top layer and use the whole contents.

IV. Determination

Weigh 100 gm. ice cream or ice cream mix into each of two 500 ml. casseroles.

(Cont. from page ahead)

tube is supported in the neck of the bottle by a slotted rubber stopper. After the material has been centrifuged, the pipette is inserted through the tube, the glass cap being pushed off, and the aliquot part desired is removed without disturbing the supernatant layer.

In lieu of this, a piece of glass tubing, 8 mm. inside diameter and about 7 1/2 in. long, may be used. The tube should be flared at the upper end, and a short cork stopper fitted onto the lower end. This stopper should be of sufficient size so that it does not rise up into the tube when the bottles are centrifuged. The tube is supported in the neck of the bottle by a slotted rubber stopper. After the material in the bottle is centrifuged the cork stopper is pushed through by means of a solid glass rod and the lower layer is removed by means of a pipette inserted through the pipette guard. (Hart, F. L., *Ibid.* 22:605, 1939).

Add 100 ml. hot water to each casserole. Heat to about 80° C., stirring constantly.

Transfer the contents of each casserole to an 8 oz. bottle. Add glacial acetic acid drop by drop, shaking after each addition, until separation of casein occurs. Insert a pipette guard. Centrifuge until the casein has collected in the upper part of the bottle (15-20 minutes).

Pipette as much of the aqueous layer as possible into a glass or platinum evaporating dish. Evaporate over steam down to about 40 ml.

Transfer contents of each dish to a 50 ml. conical centrifuge tube.

To one portion ("Portion A") add 10 ml. of a 50 per cent trichloroacetic acid solution to precipitate proteins and to remove the sodium alginate as alginic acid. To the other portion ("Portion B") add 10 ml. of a 20 per cent tannic acid solution to precipitate proteins.

From this point on treat "Portion A" and "Portion B" identically. Allow to stand 15 minutes. Centrifuge until precipitate has settled compactly (10-15 minutes). Decant through rapid filter paper (Whatman 41H) receiving the filtrate into an 8 oz. bottle. Add 4-5 volumes of 95 per cent alcohol. Allow to stand over night or until the precipitate begins to settle.

Centrifuge 15-20 minutes. Decant the supernatant alcoholic layer as completely as possible. Wash twice with 80 per cent alcohol, centrifuging and decanting after each washing. Care must be exercised to wash thoroughly the separated gums (or the gums and proteins) in order to assure complete freedom of the precipitate from the sucrose and/or reducing sugars originally present in the frozen dessert. These products themselves if present in the test portion will give a positive Benedict's test.

Dissolve residual precipitate in the bottle in 40 ml. hot water. Add 1 ml. glacial acetic acid. Without filtering,

add 4–5 volumes of 95 per cent alcohol. Allow the mixture to stand overnight or until the precipitate settles. Centrifuge and decant the supernatant solution. Add 30 ml. hot water to the residue. Transfer to a 150 ml. beaker. Add 5 ml. concentrated hydrochloric acid. Boil gently for 2 minutes. Test both "Portion A" and "Portion B" by Benedict's test and by Tollen's test as follows:

Benedict's Test: Transfer 1 ml. of the hydrolyzed gum solution to a test tube. Neutralize with approximately 2N sodium hydroxide solution, using litmus paper as an indicator. Remove the litmus paper. Add 5 ml. Benedict's qualitative reagent. Boil vigorously 1–2 minutes. Allow to cool spontaneously. A voluminous precipitate, which may be green, yellow, or red, indicates reducing sugars.

Tollen's Test: Heat the remainder of the hydrolyzed gum solution to boiling and drop in a few crystals of phloroglucinol. A red or deep amber color indicates pentoses. Certain other sugars (as galactose) also give a positive reaction to Tollen's test.

V. Interpretation

Sodium alginate is precipitated as alginic acid by trichloroacetic acid and is removed from "Portion A" along with the proteins. Hence when sodium alginate is present as a stabilizer, scanty precipitation or none at all occurs later with alcohol. Alginates are not affected by tannic acid and remain in "Portion B" to be precipitated later by alcohol along with gums. Some vegetable gums will appear in the filtrate after treatment with either protein precipitant.

However, locust bean gum and agar agar gum may be precipitated with tannic acid, and thus be removed wholly or partly with the proteins.³

These findings by alcohol precipitation may be summarized thus:

| Portion A (trichloroacetic acid) | Portion B (tannic acid) | Interpretation |
|--|-------------------------------|--|
| + | + | Gums with or without alginates |
| + | — | Gums, possibly locust bean or agar, but no alginates |
| — | + | Alginates, but no gums |
| — | — | No gums or alginates |

(+ and — signs indicate positive and negative tests for sugars on hydrolysates.)

Voluminous precipitates in both "Portion A" and "Portion B" after addition of alcohol indicate the presence of gums with or without alginates.

A voluminous precipitate in "Portion A" after addition of alcohol, responding positively to Benedict's test and to Tollen's test, indicates the presence of vegetable gums, but not sodium alginate. A voluminous precipitate in "Portion B," similarly treated with alcohol, responding positively to Benedict's test and to Tollen's test, with scanty precipitate or none at all in "Portion A," indicates sodium alginate.

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F. LESLIE HART

Germicides and Antibacterial Agents*

Laboratory Section

NEW germicidal agents of great potential importance for the control of communicable disease are currently in process of development and application. The Standard Methods Committee for the Examination of Germicides and Antibacterial Agents has been organized this year. Five of the eight members of the committee have papers on the program of this Annual Meeting. The present report represents, however, a statement by the chairman in regard to the membership of the committee and the scope of its activities rather than a report by the several referees on their special fields.

The achievement of a considerable measure of control over the broad categories of the *intestinal* and the *insect-borne diseases* has been a major success in public health endeavor. The infections contracted through the respiratory tract, the *air-borne diseases*, however, stand today as an unanswered challenge to those concerned with protecting the public health. The childhood contagions, whooping cough, measles, mumps, chicken pox and scarlet fever are presumably contracted through the respiratory tract; colds and upper respiratory infections cause by far the greater part of the absences from work in adults; influenza, measles and their complica-

tions have periodically, and particularly under war conditions, flared up into destructive epidemics and pandemics. No one of these major hazards from air-borne disease is under satisfactory control at the present moment, although a few far-sighted individuals are now vigorously investigating potential means for their control.

It is a great pleasure, therefore, to announce that Professor O. H. Robertson, of the University of Chicago, and Dr. Alexander Hollaender, of the National Institute of Health, have accepted membership on the Standard Methods Committee for the Examination of Germicides and Antibacterial Agents as Referees, respectively, on germicidal vapors and mists and on ultra-violet radiation for the disinfection of air.

Another new class of germicidal agents are those metabolites of certain bacteria and fungi which are antagonistic to many pathogenic microorganisms. Bacterial antagonistic substances are not only of great scientific interest, but they are already finding practical use in clearing up infections, for instance, due to sulfonamide-resistant strains. Much of the current activity in this field has originated in the laboratory of Dr. Selman A. Waksman, President in 1942 of the Society of American Bacteriologists. Dr. Waksman has consented to act as Referee on Antibiotic Substances.

Detergents, both anionic and cationic, have latterly assumed importance as practical germicides. Dr. W. L. Mallmann, of the Michigan State College, has had much experience in this field and has consented to act as Referee in it.

* Report of the Chairman of the STANDARD METHODS COMMITTEE FOR THE EXAMINATION OF GERMICIDES AND ANTIBACTERIAL AGENTS. This committee was originally authorized as the Standard Methods Committee for the Examination of Disinfectants and Antiseptics (*American Public Health Association Year Book, 1941-1942*, page 19). The change of name was authorized by action of the Coördinating Committee as better representing the scope of the committee.

In the established field of chemical antiseptics and chemical germicides, the committee is fortunate in having two referees of experience and established reputation, Dr. Henry Welch of the Food and Drug Administration and Dr. C. M. Brewer of the Department of Agriculture.

Fungous infections of the skin are a widespread source of annoyance and discomfort and under war conditions have become a serious source of disability. A refereeship on fungicidal and fungistatic agents has therefore been established and been accepted by Dr. C. W. Emmons of the National Institute of Health.

The chairman of this committee, as a member of the Council on Pharmacy and Chemistry of the American Medical Association and certain relevant National Research Council committees, has many occasions for desiring clarification of criteria and standards for all classes of germicidal agents, chemical, physical, and biological. The Council of Pharmacy and Chemistry already enjoys full coöperation with the National Institute of Health and the Food and Drug Administration. The membership of our committee of the Laboratory Section,

American Public Health Association, should aid in the coördination of ideas and information among those charged with working toward standards of safety and efficacy of all classes of germicidal agents and of working out optimal conditions for their use.

The present members of the Standard Methods Committee for the Examination of Germicides and Antibacterial Agents are:

STUART MUDD, M.D., *Chairman*

Antibiotic Agents: SELMAN A.

WAKSMAN, PH.D.†

Chemical Antiseptics: HENRY WELCH, PH.D.*

Chemical Disinfectants: C. M. BREWER*

Detergents: W. L. MALLMANN, PH.D.*

Disinfection of Air by Germicidal Vapors and Mists: O. H. ROBERTSON, M.D.†

Disinfection of Air by Ultra-violet Irradiation: ALEXANDER HOLLAENDER, PH.D.†

Fungicidal and Fungistatic Agents: C. W. EMMONS, PH.D.†

* Referee

† Associate Referee

Credit Lines

THE department "Credit Lines" is an orphan. It has been abandoned by its foster-parents most unwillingly, but nevertheless definitely, for the duration. This comes about because the successful partnership between the editors, Donald B. Armstrong, M.D., and John Lentz, has been interrupted by the departure of Captain Lentz for the armed services. Dr. Armstrong feels that he cannot cope with it alone and so returns it to the shelter from which he derived his custodial powers in the first place, the Editorial Board.

And the Editorial Board has taken it in, realizing that it cannot be maintained in the style to which Dr. Armstrong and Mr. Lentz accustomed it, but determined to do the best they can by it. The Board hopes to keep it neat, groomed, well-mannered, obliging, and helpful. Inasmuch as its personality has changed overnight, there is a suggestion that its name had better be changed as well so that any signs of neglect will not bring discredit to the previous editors. This has been worth thinking about and the thinking has resulted in a somewhat lengthy list of names from a dozen sources. Each contributor thinks his own titles are the best and yields to no one. In this stalemate, it seems wise to turn to all the relatives and ask the readers of the JOURNAL to choose the name. Those currently in command refuse to consider any additions to the list. They stand or fall on their own offerings. The rules of this contest are simple.

1. Select, from the list at the end, the title you think best describes a department whose purposes will presently be outlined.

2. Write it on a postcard with your name and address and mail the card to "Title Editor," *American Journal of Public Health*, 1790 Broadway, New York, N. Y., before midnight on June 15.

The department "Credit Lines," as it must be called until it is formally rechristened, is everybody's baby and it is hoped that many will contribute to its support. In its halcyon days, when it was the charge of Dr. Armstrong and Mr. Lentz, and in a previous incarnation when it flourished under the caption "Health Education and Publicity Notes," and the care of the late Evart G. Routzahn, it enjoyed a wide circle of readers and admirers, especially among health educators. The editorial direction was inspired, and abundantly gifted with the talent of selecting from mountains of mail, printed matter and mimeographed documents and from conversation those pithy bits and new ideas worth passing on to others. It can hardly be expected that this critical faculty, this genius for evaluating, will be found frequently again in one person or in a combination of two people even with regard to one specialty like health education. It is far less likely that one person or a team can cover all public health specialties, including health education. A lot of people, however, taking some responsibility for "Credit Lines," each exploring his own intimately known terrain, can, if they will, bring to the department a rich and diversified collection of new and original technics in public health—that is, new to the rest of us.

"Credit Lines," then, or whatever it is to be called, may be described as a

department appearing more or less regularly in the JOURNAL whose contents are decidedly miscellaneous and are brought together by a miscellaneous group. One issue may be devoted entirely to the newer motion pictures. One may contain half a dozen administrative tricks of health officers, born of ingenuity and the man power shortage. Another may present the laboratory's response to priorities and substitute materials. Still another may include short accounts of what is happening and who is making it happen in a variety of situations of interest to health workers. And the majority of issues will doubtless defy classification or over-all captioning.

Suggestions are invited. Contributions are solicited. The erstwhile "Credit Lines" is everybody's baby. What shall we call it hereafter? These are the names that have been advanced. Mail your selection today!

Men at Work
Credit Lines
Grist for the Mill
Cross Infections
Contagious Ideas
Out of Quarantine
Quarantine Lifted
No Ivory Towers
No Rights Reserved
No Copyrights
A Room with a View
More Tonic than Sedative
Stimulants
The Idea Commissary
Yours for the Taking
It's Being Done
The Hopper
The Grapevine
What's Happening
Passed by the Censor
Pass at Your Own Risk
Diagnosis and Prognosis
The Maternity Ward
Brainstorms
Eye It—Try It
Who's Immune
Positive Reactions
Contact Corner
The Prenatal Clinic

Specialists Pool

Several requests have been received for more information concerning the Military Government Division of the Provost Marshall General's Office. The Military Government Division is creating a pool of highly skilled men in a variety of technical and professional fields for future use in the military government of hostile areas ultimately to be occupied by American armed forces.

To be eligible for a commission in this "Specialists Pool," applicants must have had a good basic education and broad administrative or executive experience in government with a state, county, city, or federal department, or as experts in finance, education, sanitation, public welfare, public works and utilities, communications, public health, public relations, public safety, or eco-

nomics. Importance is attached to demonstrated administrative and executive ability and to knowledge of foreign countries and foreign languages. Applicants must be between the ages of 35 and 55:

Those selected will be appointed in the Officers Reserve Corps and may be called to active duty, for a period of 4 months for training, after which they will be carried in an inactive status, without pay, permitting the continuance of their present civilian activities until their services are required. They will not be subject to draft. A very small number of those commissioned may be selected to attend the School of Military Government located at the University of Virginia, Charlottesville, Va.—"On the Alert." Community Chests and Councils.

BOOKS AND REPORTS

Introduction to Psychiatry—By *W. Earle Biddle, M.D., and Mildred van Sickel, R.N.* With a foreword by *William C. Sandy, M.D.* Philadelphia: Saunders, 1943. 358 pp. Price, \$2.75.

This book is written by a graduate nurse and a psychiatrist who have tried hard and succeeded in putting before the reader a description of practical considerations that have to be met and dealt with by the relatives, friends, doctors, and nurses who are concerned with the psychiatric hospital care of mentally ill patients. I am glad that it comes from a state hospital because its presentation of facts should be of great educational value to all sorts of people who regard state psychiatric institutions as asylums instead of hospitals.

This little book answers hundreds of questions which families and doctors of families ask when psychiatric hospitalization is advised. Unit I speaks of Orientation to the Nursing Service. Unit II embraces Special Therapies in the Treatment of Psychiatric Disorders. Unit III discusses Psychiatry in Relation to Psychiatric Nursing. Unit IV gives a brief resume of Psychiatric Disorders. Unit V gives a much needed chapter devoted to Psychiatry and the Community.

This book should be in every library of training schools for nurses. It is especially useful as a practical textbook for nursing education instructors in training schools and hospitals where psychiatric nursing is part of the school program. As a teacher of psychiatry and mental hygiene for the past twenty-five years in four nurses' training schools I can truthfully say that it is a much needed book which I shall take pleasure in recommending to students and teachers.

ESTHER LORING RICHARDS

Manual of Veterinary Bacteriology—By *Raymond A. Kelsner and Harry W. Schoening.* (4th ed.) Baltimore: Williams & Wilkins, 1943. 719 pp. Price, \$6.50.

The fourth edition of this well established book is welcome. Owing to the demands on his time and attention due to the war the senior author has associated with him H. W. Schoening, Chief of the Pathological Division, and Assistant Chief, of the Bureau of Animal Industry.

There are a number of notable additions and some rearrangement. The whole book has been brought up to date. There have been many advances in our knowledge of disease-producing organisms in the five years which have elapsed since the third edition, and veterinary science has shared in the general advance. We have also learned more of the diseases common to animals and man and transmissible from animals to man. These advances are well considered and presented. We need mention only the studies on encephalomyelitis to emphasize the importance of bringing these subjects up to date. It was 1939 when the Eastern type of virus was found west of the Appalachians and the Western type was found in the East. In 1937-1938 relationship between equine encephalomyelitis and St. Louis encephalitis was demonstrated, and in 1941, susceptibility of horses to St. Louis encephalitis was proved.

There are 117 pages given to the Introduction and Bacteriological Methods. The discussion on Infection and Immunity which comes next is adequate. Especially useful for the veterinary student, and too little known by the medical profession, is Part XI describing the production of vaccines, sera, antitoxins, etc.

The only criticism to be made is from the standpoint of the human physician. We believe that a little more discussion of the transmissibility of animal diseases to man would be an improvement. Under tuberculosis, for example, much more could be said about the transmission of the animal disease to human beings, especially in regard to the number of cases of pulmonary tuberculosis found in human beings due to the bovine organism. The history of the controversy is not as full as it might be, and in some places, as on page 378, there is room for a misunderstanding by people who are not careful readers of the whole text on tuberculosis. For example, under "Pathogenicity," there is not a word which would indicate that the bovine tubercle bacillus can produce tuberculosis in human beings. It is true that this is mentioned elsewhere, but certainly it should be mentioned in this place also. The authors persist in using "B.C.G." as an abbreviation for Bacille Calmette-Guérin, which is incorrect. It should be "BCG."

Altogether, the book is satisfactory and a welcome addition not only to our literature, but to the armamentarium of the teacher. It is beautifully printed on thin paper so that the 719 pages which it contains, including the excellent index, make a book of convenient size which is easy to handle and to read.

MAZYCK P. RAVENEL

Religion and Health—By Seward Hiltner. New York: Macmillan, 1943. 292 pp. Price, \$2.50.

This volume reveals an extension of applied mental hygiene into a newer field. Written by the executive of the Federal Council of Churches' Commission on Religion and Health, it brings before an audience of clergymen and other church workers a modern and constructive attitude toward behavior problems, mental illness, personal counseling, and ministry to the sick. Public

health workers will do well to be familiar with a rapidly growing movement in the churches which has enormous potentials for healthy minded attitudes toward mental and physical health. The book is commended.

REGINALD M. ATWATER

Laboratory Manual on Fundamental Principles of Bacteriology—By A. J. Salle, Ph.D. (2d ed.) New York: McGraw-Hill, 1943. 184 pp. Price, \$1.50.

This is a carefully revised second edition, with some old material discarded and valuable new procedures incorporated. The title is appropriate as the experiments are so chosen as to emphasize the fundamentals of bacteriology. The book is well adapted to the needs of students taking a general course in bacteriology, or of students of chemistry, sanitary engineering, or public health since it deals with the effects of environment upon bacteria and also with the applications of bacteriology in the examination of water, milk, and milk products, foods, and soil. The book is well printed, but will the day never come when an author will force the printer of a manual to use at least a modicum of type larger than 6 point! The laboratory exercises are unusually complete, and the contents strikingly well arranged under headings and sub-headings that follow a consistent pattern throughout the volume.

After the author has stated in the preface that this revision accompanies the second edition of his revised textbook, it is a little annoying to find in this 184 page manual the following reference appearing 94 times: "Salle, A. J., *Fundamental Principles of Bacteriology*, 2nd ed., New York, McGraw-Hill Book Company, Inc., 1942."

Especially well written directions head each exercise. The suggestions that are included should arouse interest in the experiments and serve well to

call attention to points the author rightly considers worth emphasis. Intriguing questions that follow each exercise taxed the ability of this reviewer always to answer them without resort to the frequently mentioned textbook. An appendix giving formulae for the preparation of 56 solutions and stains and 42 varieties of culture media should be of value to the student.

FRIEND LEE MICKLE

Public Health Statistics—By Marguerite F. Hall. New York: Hoeber, 1942. 408 pp. Price, \$5.50.

A simple but reliable text on public health statistics would be welcomed by health officers. The Foreword as well as the Table of Contents of the present book would lead one to expect such a volume. Unfortunately, there are so many loose and inaccurate statements both as to the subject matter of public health statistics and in the exposition of statistical methods that the book cannot be recommended either for the classroom or the reference shelf.

Space will permit only a few examples of the many misleading sentences which challenge the critical reader continuously. For instance such statements as "The country is divided into census tracts, each tract having a supervisor and assigned enumerators," in the description of the census on page 89, or "The Life Table Standard Million reflects the natural growth of population measured by excess of births over deaths" (page 139), are inaccurate. These and many similar sentences represent carelessness in expression or superficial knowledge on the part of the author.

More serious is the confusion found in the discussions of statistical technics. It is desirable that mathematical concepts be presented in simple language but the argument must remain logically sound. Many of the definitions, notations, and applications of statistical

methods are confusing. For example, in Chapter XIV, which describes the short method for the construction of the life table proposed by Reed and Merrell, the notation is badly mixed up. Further the misapplication of the method when the original data are not available to the end of life results in a half year underestimation of the expectation of life at birth with a larger error at older ages.

Lack of a fundamental understanding of random sampling, the binomial theorem, and the use of the standard error are each illustrated by the discussion of "Chances with a small sample" on page 348. This section purports to answer the question "What are the chances that 6 out of 7 potential patients actually become ill during a given month?" The remainder of the section is a jumble of words that has little, if any, bearing on the answer to the question posed. One should be able to state the solution quite simply. In fact the solution is given on page 332. Perhaps the difficulty arose first in the meaning of the statement, "in a random sampling of potential patients the chances are even for a person to become ill." Does the author mean more than that each person in a random sample is equally likely to become ill? The probability of becoming ill in a sample chosen at random is not a function of randomness but of the universe from which the sample is drawn. It is this probability or estimate of it that is represented by p in the binomial $(p+q)^n$. The vexing problem of medical care would indeed be insolvable if one half of a physician's panel were ill each month. This, unconsciously, is the author's postulate in trying to answer the above question.

Readers will find these sections and many others confusing and of little assistance in the sound application of statistical methods to the problems of public health. W. THURBER FALES

Occupational Tumors and Allied Diseases—By W. C. Hueper. *Springfield, Ill.: Thomas, 1942.* 896 pp. Price, \$8.00.

This impressive monograph presents another indication of the growing interest in the field of industrial disease. As indicated by the title, major emphasis is placed on occupational tumors, particularly epitheliomata of the skin, but consideration is also given to carcinomata of the internal organs, benign and malignant tumors of the mesenchyme, diseases of the blood forming organs, and allied conditions such as dermatoses, polyposis, and cirrhosis of the liver.

The presentation of the subject is exhaustive. Occupational tumors and allied conditions of each system are reviewed in terms of etiologic agents, frequency, pathology, symptomatology, experimental studies, causative mechanism, and preventive and medico-legal aspects. Considerable attention is paid in each instance to the chemistry of the exciting agent and the evidence provided by animal experimentation. The closing chapters are devoted to a general discussion of occupational tumors and theories of cancerogenesis.

The work can be highly recommended for its comprehensive analysis of the action of the well recognized chemical and physical carcinogenic agents and their effects on the skin, genitourinary system, and blood forming organs. In the discussion of tumors of certain internal organs, and of the relation of occupational neoplasia to theories of cancerogenesis, however, the author enters on highly speculative ground. The hypothesis is advanced that many of the internal systemic cancers are attributable to the late results of ill defined exposures to toxic chemicals but is not sustained by the statistical or experimental evidence presented. On the other hand, the effects of chronic irritation are minimized in instances such as

cancer of the lip in pipe smokers, carcinoma of the stomach associated with ulcer, and cancer of the cervix in multiparous women.

The volume is attractively printed and well indexed. The bibliography is extremely complete but would be improved by being numbered to facilitate reference to the text.

ARTHUR B. ROBINS

How to Teach Nutrition to Children—By Mary Pfaffmann and Frances Stern. *New York: Barrows, 1942.* 224 pp. Price, \$2.00.

As admirably stated in the introduction, *How to Teach Nutrition to Children* is a series of lessons to help the child understand how the food constituents—protein, carbohydrate, fat, calcium, iron, and the vitamins—build the body, furnish energy, protect health and promote growth.

The subject matter content and the method represent years of experimentation by the authors in instructing children at the Boston Dispensary Food Clinic. The authors have presented not only scientific facts about foods in their relation to health and growth of children, but the method they have found successful in the food clinics situation with children of the intermediate grade age. They have suggested stories, games, and drama to supplement the factual material. The subject matter is scientifically sound, the sources of illustrative material concrete, the charts explicit, and the applications direct. The underlying philosophy shows a deep understanding of children, of what appeals to their imagination, and the kind of handwork which impresses on their minds the facts being taught. The authors have adventured in using the metric system units to teach the daily requirement of food constituents, and are to be congratulated on their wisdom and foresight in doing so, since the metric units are being increasingly used by the lay-

man to express scientific values. Nutrition being a science, children can and should learn the proper terminology for expressing its findings.

How to Teach Nutrition to Children should be a real help to teachers in the grades, and illustrative of successful methods for educating children in situations such as the authors have met them.

MARY E. SWEENEY

Good Nutrition for Everybody—
By L. Jean Bogert. Chicago: Chicago University Press, 1942. 165 pp. Price, \$1.50.

When the food one eats becomes, as it does in wartime, a vital weapon, meals must be planned on a practical working knowledge of nutrition. When energy flags and vitality ebbs, it is difficult to be a courageous, vital, buoyant person. Both morale and efficiency rest on health, and good nutrition is basic to both. Dr. Jean Bogert knows this and also knows that good nutrition is none too easy to come by when food habits must be changed to conform to wartime markets and rationed supplies.

Good Nutrition for Everybody is a concise, simple, common sense guide to good meals in wartime. It contains no frills, no furbelows, no special diets. It is a summary of the facts one needs to know about food in order to wangle three nutritious and more or less interesting meals a day from our dwindling food supply. Dr. Bogert's practical suggestions on cooking methods are basic and good. Her emphasis is on the normal diet for the family of average means. She recognizes the difficulties involved in changing well established diet patterns but she is firm in her opinion that fastidious diets must yield to stern discipline in a world at war. Only out of a wealth of training and practical experience could material be presented so simply, so accurately.

The book contains some 123 recipes. These are more practical than interest-

ing—but so are meals in wartime. The menus suggested are planned with a patriotic regard for both time and materials. This book should be useful to anyone whether he eats at home or at a restaurant—or anyone who accepts the fact that good nutrition is built on established well documented fact.

When food is scarce, good nutrition is based on knowing, not guessing about basic food facts. One must know a few simple rules. These are carefully presented by Dr. Jean Bogert. Thoughtful people who want to know *how* as well as *why* one must cook food and plan meals carefully will find this book useful. The smaller the variety of foods on the market, the more important this type of information becomes.

The material Dr. Bogert presents in this book is concise, fairly readable, and very usable.

ELOISE DAVISON

The Sight Saver—*By C. J. Gerling. New York: Harvest House, 1943. 202 pp. Price, \$2.00.*

Written primarily for the lay public, *The Sight Saver* is a sound and practical handbook of information about the organ of vision and the possibilities for its protection. The material is arranged alphabetically, with ample cross-indexing to facilitate location of subjects under a variety of headings. Explanations and recommendations are in keeping with medical science and with the teachings of other groups whose activities are related to the preservation of eyesight. However, as emphasized by the author, the text is not intended for purposes of self-diagnosis or self-medication; the aim, rather, is to show the need for reliable and timely medical attention by giving the reader an understanding of the eye and the potential hazards of disease and injury.

Included in the extensive range of topics are the structural parts of the eye, the mechanics of seeing, errors of refraction, glasses, diseases, relation of

ocular disturbances to systemic conditions, illumination, protective devices and other factors affecting eye comfort and safety at work, at home, and at play. The respective spheres of service of ophthalmologists, optometrists, and opticians are defined, and a warning is sounded against quacks and fraudulent practitioners. Similarly, milady is cautioned in the matter of eye cosmetics, nostrums and kindred preparations purporting to enhance "the windows of the soul"; some may, at best, be utterly valueless while others may cause serious damage to vision.

Persons interested in further study of the subjects are offered a list of books and pamphlets as well as the names of agencies from which pertinent information may be obtained.

REGINA E. SCHNEIDER

Interstate Sanitation Commission
—*New York, New Jersey, Connecticut—1942 Annual Report.* New York: 60 Hudson Street. 87 pp.

The sixth report of the Interstate Sanitation Commission summarizes the commission's activities for the year, and its findings from analyses made at each of the sewage treatment works within the District. It also sets forth the progress made in the abatement of pollution in the same area.

The report contains an outline of the commission's policy which is being formulated to meet the conditions imposed by the war. The commission is taking steps to urge municipalities to develop a financial program whereby treatment works can be built when conditions permit. Municipalities are also being persuaded to prepare the necessary plans and specifications and bills of material so that they can proceed with construction without delay at the proper time.

The report describes eight locations where new treatment works have been placed in operation or major improve-

ments to existing treatment works have been completed.

A summary of analyses made of the influents and effluents of the various treatment works within the District is contained in the report. This table sets forth, among other things, the flow, hydrogen-ion-concentration, suspended solids removal, settleable solids removal, biochemical oxygen demand, residual chlorine, and the most probable number of coliform organisms. Plant performances have been rated on their ability to meet Compact requirements which are established by law. The report also contains a summary of the commission's findings concerning each of these treatment plants.

SETH G. HESS

Services to the Orthopedically Handicapped—Report of a Study under the Auspices of the Trustees of the Widener Memorial School for Crippled Children, by Louis P. Hoyer and Charles K. Hay. Philadelphia, 1942. 115 pp.

The authors studied school systems and agencies rendering services to the orthopedically handicapped in Philadelphia and a number of other cities and used the information gained in making recommendations for future planning of the services in Philadelphia, which are administered by the Board of Public Education.

As would be expected, the study and report are concerned primarily with educational services for the crippled child, but the breadth of the authors' concept of the functions of the school for the orthopedically handicapped far exceeds anything now in existence. Such a school would be the center about which all other community services for this group would revolve and would serve those on the preschool, secondary, and adult levels, as well as the elementary level. The need for these services is well brought out. Workers of all professions who are satisfied in attacking

small segments of the large field of rehabilitation of the orthopedically handicapped will do well to absorb some of the vision and philosophy expressed in this little book.

Administrators of agencies engaged in carrying out treatment programs in this field may well look skeptically on the recommendation that a corps of specially

prepared and equipped "coördinators," responsible to the Director of Education, be employed to assume most of the functions now assumed by public health nurses and medical social workers. Still another kind of professional worker in this particular area would certainly necessitate some coördination!

JESSIE M. BIERMAN

BOOKS RECEIVED

- EXPLORING THE DANGEROUS TRADES: THE AUTOBIOGRAPHY OF ALICE HAMILTON, M.D. Boston: Little Brown, 1943. 427 pp. Price, \$3.00.
- FLYING MEN AND MEDICINE. By E. Osmun Barr. New York: Funk & Wagnalls, 1943. 254 pp. Price, \$2.50.
- BEHIND THE SULFA DRUGS. A SHORT HISTORY OF CHEMOTHERAPY. By Iago Galdston. New York: Appleton-Century, 1943. 174 pp. Price, \$2.00.
- BRUCELLOSIS IN MAN AND ANIMALS. By I. Forest Huddleson. rev. ed. New York: Commonwealth, 1943. 378 pp. Price, \$3.50.
- SYNOPSIS OF DISEASES OF THE SKIN. By Richard L. Sutton and Richard L. Sutton, Jr. St. Louis: Mosby, 1942. 481 pp. Price, \$5.50.
- DICTIONARY OF BIO-CHEMISTRY AND RELATED SUBJECTS. William Marias Malisoff, Editor-in-Chief. New York: Philosophical Library, 1943. 579 pp. Price, \$7.50.
- DOCTOR IN THE MAKING. THE ART OF BEING A MEDICAL STUDENT. By Arthur W. Ham and M. D. Salter. Philadelphia: Lippincott, 1943. 179 pp. Price, \$2.00.
- MANUAL OF INDUSTRIAL HYGIENE AND MEDICAL SERVICE IN WAR INDUSTRIES. William M. Gafafer, Editor. Philadelphia: Saunders, 1943. 508 pp. Price, \$3.00.
- A TEXTBOOK OF MEDICAL DISEASES FOR NURSES, INCLUDING NURSING CARE. 5th ed. By Arthur A. Stevens and Florence Anna Ambler (Hay). Philadelphia: Saunders, 1943. 623 pp. Price, \$2.75.
- ESSENTIALS OF INDUSTRIAL HEALTH. By C. O. Sappington. Philadelphia: Lippincott, 1943. About 600 pp. Price, \$6.50.
- ETHICS FOR NURSES. By Charlotte A. Aikens. 5th ed. Philadelphia: Saunders, 1943. 378 pp. Price, \$2.50.
- NURSING HISTORY IN BRIEF. Designed for Course of 15 hours or less. By Minnie Goodnow. 2d ed. Philadelphia: Saunders, 1943. 338 pp. Price, \$2.25.
- STAY YOUNG AND LIVE. By J. Clarence Funk. Richmond: The Dietz Press, 1943. 125 pp. Price, \$1.75.
- SANITARY INSPECTOR'S MANUAL. By Ben Freedman. New Orleans: Louisiana State Department of Health, 1943. 360 pp.
- THE EPIDEMIOLOGY OF RHEUMATIC FEVER AND SOME OF ITS PUBLIC HEALTH ASPECTS. By John R. Paul, *et al.* 2d ed. 163 pp. New York: Apply to the American Heart Association.
- 20 YEARS OF MEDICAL RESEARCH. By Dorothy White Nicolson. New York: National Tuberculosis Association, 1943. 97 pp.
- THE HEALTH STATUS OF NYA YOUTH. A Nation-Wide Survey of Youth on the Out-of-School Work Programs of the National Youth Administration. Washington: Government Printing Office, 1943. 77 pp.
- BLOOD GROUPS AND TRANSFUSION. By Alexander S. Wiener. Springfield: Thomas, 1943. 438 pp. Price, \$7.50.
- PRIMER OF ALLERGY. By Warren T. Vaughan. 2d ed. St. Louis: Mosby, 1943. 176 pp. Price, \$1.75.
- WHAT THE PUBLIC KNOWS ABOUT HEALTH. By Mayhew Derryberry, Arthur Weissman and George Caswell. New York: American Museum of Health, 1942. 144 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Aiming toward Preventive Medicine—In Nebraska, demonstrations with two types of prepaid medical care plans are under way. In a sparsely settled region, a doctor and a nurse furnish preventive and curative services on a salaried basis to families that pay \$30 a year. In a thickly populated area, farmers pay to a central fund 6 per cent of their cash net income and for it are assured medical and hospital care, some dental care, and commonly prescribed drugs. This is a heartening story well told.

ANDERSON, E. L. Nebraska's Extension Service on the Health Front. *J. Home Econ.* 35, 3:137 (Mar.), 1943.

When Women Work—Here you will find a bird's-eye view of industrial production methods, work clothes, plant sanitary facilities, employees' meals, and health conditions outside the factory gates as they affect the 14 million and more women in industry. Every health worker worth his salt will seize every opportunity to gather in each scrap of information on this vital subject.

ANDERSON, M. Industry, Women, Safety and Health. *Am. J. Nurs.* 43, 3:275 (Mar.), 1943.

Sanity in Nutrition—Vitamin capsules speed production. Candy bars prevent fatigue and reduce accidents. Doughnuts between meals reduce absenteeism. Chewing gum with ascorbic acid works other wonders. Gum drops with salt do likewise. Crackers full of minerals and vitamins are the last word in "pep" production. These are some of the selfishly promoted dietary delu-

sions with which the industrial nutritionist must wrestle. Two papers listed here help with the answers.

BING, F. C. Criteria for the Evaluation of Nutrition Experience in Industry. (and) COWGILL, G. R. Current Nutritional Activity in Industry. *J.A.M.A.* 121, 11:813 (Mar. 13), 1943.

By the Hundreds of Billions—A statistic you may want to remember: in 1930 there were manufactured 123 billion cigarettes or 1,500 a year for every man, woman, and child over 14. Since then more and more cigarettes have been smoked. There was a 12 per cent increase during the first quarter of 1941 over the same period of the preceding year. Mentioned here is the increasing suspicion that this Himalayan heap of tobacco bears some relationship to the growing incidence of stomach ulcer.

BOWLES, R. S. Observations on the Prevention and Management of Peptic Ulcer. *J.A.M.A.* 121, 9:640 (Feb. 27), 1943.

What Would You Expect To Be the Answer?—Immunization clinics have an added educative value, the health educators are wont to insist. Three show-me investigators had the temerity to put this assertion to the test. It would be unforgiveable to spoil the story by quoting the findings here—but health educators are warned not to raise their hopes.

BRESLOW, L., *et al.* Parental and Familial Factors in the Acceptance of Diphtheria and Smallpox Immunizations. *Pub. Health. Rep.* 58, 10:384 (Mar. 5), 1943.

Hopeful Note Department—A half century hence, 15 out of every

hundred will be over 65 years of age, and this army will be better qualified for useful work than are elderly people today—thanks to more science and better art in medicine. Suitable work for our ageing population is profitably discussed.

CARLSON, A. J. The Older Worker. *J.A.M.A.* 121, 11:806 (Mar. 13), 1943.

Against One Hazard of Infancy—

Evidence is presented that the immunization of pregnant women with pertussis vaccine results in transmitting some degree of protection to the newborn babies to carry them through the dangerous period of infancy when they seem especially susceptible to whooping cough. There was no discernible effect upon the progress of the pregnancy.

COHEN, P., AND SCADRON, S. J. The Placental Transmission of Protective Antibodies Against Whooping Cough. *J.A.M.A.* 121, 9:656 (Feb. 27), 1943.

More about Rheumatic Fever—

Of 241 children suffering from hemolytic streptococcal infections during an institutional oral outbreak of tonsillitis, 88 had rheumatic fever. Among other findings of this study of the evident relationship between the two conditions are: familial predisposition is still an important factor; the most susceptible age group was 9–14; and the weather didn't count.

DITKOWSKY, S. P., *et al.* An Epidemic of Rheumatic Fever in a Children's Institution. *J.A.M.A.* 121, 13:991 (Mar. 27), 1943.

“Canada Approved”—Among a great many other dietary matters, there is a blessing given here to “Canada Approved” flour which produces bread almost white in color, but containing most of the valuable nutrients of the wheat berry with it, the British population will not lack for Vitamin B₁, says this authority. Apparently the British haven't our genius for taking out the natural nutrients from our food stuffs,

then putting back ersatz substitutes. No doubt they'll learn in time.

DRUMMOND, J. C. Problems of War-time Nutrition. *J. Roy. Inst. Pub. Health & Hyg.* 6, (1 & 2):26 (Jan. & Feb.), 1943.

Hygienist, Know Thyself—For a clearly told story of Dr. Kruse's studies in subclinical nutritional deficiency states among people like yourself, you will hunt far to find a better. This paper is addressed to public health nurses but its reading will do you a lot of good whatever your professional field may be.

DWIGHT, J. C. The Newer Knowledge of Malnutrition. *Pub. Health Nurs.* 35, 2:87 (Feb.), 1943.

Syphilis in Alabama—Of about 200,000 blood tests taken on draft registrants, 9 per cent were positive. Of the white men 1.5 per cent were positive and of the Negroes, 19.8 per cent. Urban rates were materially higher than rural and the bigger the city the worse the record. As Alabama has a million Negroes, the magnitude of its venereal problem is evident.

GILL, D. G., *et al.* Syphilis in Alabama as Revealed by a Serologic Survey of Selective Service Registrants. *Ven. Dis. Inform.* 24, 1:6 (Jan.), 1943.

Industrial Hazards Peculiar to Women—Useful recommendations for meeting the peculiar health needs of women in industry are presented in this preliminary report. Here you will find practical discussions about work during menstrual difficulties, before and after childbearing, and during the menopause.

HESELTINE, H. C., *et al.* Women in Industry. *J.A.M.A.* 121, 11:799 (Mar. 13), 1943.

Honesty Is the Best Policy—At present there are no effective methods available for the prevention of colds. Vaccines are of no practical value. Vitamins fail to prevent colds. “Hardening” the body is useless. The

prevention of other respiratory infections is subjected to similarly competent scrutiny and reported upon with equal candor.

KEEFER, C. S. Control of Common Respiratory Infections. J.A.M.A. 121, 11:802 (Mar. 13), 1943.

Making the World Safe—A large group of Negro soldiers were given sulfathiazole before and after leaving camp. The gonorrhea rate dropped from 171 to 8 and the chancroid rate from 52 to 6.

LOVELESS, J. A., AND DENTON, W. The Oral Use of Sulfathiazole as a Prophylaxis for Gonorrhea. J.A.M.A. 121, 11:827 (Mar. 13), 1943.

North Carolina Does It—More work—fewer workers. The North Carolina Health Department was faced with this problem—as what state hasn't been—and proceeded to do something intelligent about it. Whoever you are, and whatever may be your job, you will be immensely impressed with what was accomplished.

MOUNTIN, J. W. A Self-help Solution of State Personnel Problems. Pub. Health Rep. 58, 8:297 (Feb. 19), 1943.

It Worked with Cows—All will admit that cows are more important than women and men! But in Minnesota, a project is under way to apply methods similar to those that have cleared the county of bovine tuberculosis—the greatest hygienic feat in recorded history—to ridding the state, county by county, of human tuberculosis. Belief is expressed that accreditation of counties has done more to stimulate action in preventing the spread of human tuberculosis, than any other movement. You'll be interested in this.

MYERS, J. A. County Accreditation Plan for Tuberculosis Control. J.A.M.A. 121, 12:921 (Mar. 20), 1943.

You Can't Argue with a White Rat—How men and women workers were weaned from pastry and soda-pop luncheons to salad sandwiches and milk is told briefly by one who did it.

PAGE, E. S. Nutrition Education at the Fisheries. J. Home Econ. 35, 3:156 (Mar.), 1943.

All White Bread Is Ordered Enriched—In the average American's diet, restoration of thiamin in white flour to whole wheat level helped greatly, but does not entirely correct the well known deficiency in that food factor, and enrichment with riboflavin to whole wheat level will not correct the usual dietary deficiency in this second factor. In this report are many interesting comments on carbohydrate consumption.

WILLIAMS, R. D., *et al.* Evaluation of Nutritive Contribution of Enriched White Flour. J.A.M.A. 121, 12:943 (Mar. 20), 1943.

"Education" Means To Lead Out—You can fairly easily get people to pay taxes for protection against epidemics, but it is another matter to get them to provide for housing, medical care, and social security—to promote national health. Health education is going to have much harder sledding in the future, the easy jobs of motivation have been done, says this wise man.

WINSLOW, C.-E. A. Health Education in a Democracy. Science 97, 2513:189 (Feb. 26), 1943.

It's about Time—Boiling garbage for ½ hour will kill trichinae, and will prevent the infection of garbage few hogs, the chief source of trichinosis. Why not demand this safeguard everywhere?

WRIGHT, W. W., AND BOZICEVICH, J. Experiments in the Cooking of Garbage for the Destruction of Trichinae in Pork Scraps. Pub. Health Rep. 58, 10:396 (Mar. 5), 1943.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND SEVENTY-SECOND ANNUAL BUSINESS MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

COMMITTEE ON STANDARD METHODS OF FOOD UTENSIL SANITATION

A new committee on Standard Methods of Food Utensil Sanitation has been appointed by the Committee on Research and Standards. Walter D. Tiedeman, M.C.E., Chief of the Bureau of Milk Sanitation, New York State Department of Health, will act as *Chairman*.

This new committee will have representation from the Laboratory, the Engineering, the Health Officers, and the Food and Nutrition Sections. It replaces three earlier committees, all concerned with the same problem, namely, the Subcommittee on Standard Methods for the Examination of Dishwashing Devices of the Committee on Research and Standards, the Committee on Disinfection of Dishes and Utensils of the Engineering Section, and the Committee on Food Utensil Sanitation of the Food and Nutrition Section.

Because of the widespread interest in the problem of food sanitation, the Committee on Research and Standards hopes that this representative group will be able to formulate a statement of what constitutes good practice in this field from the technical point of view. When the other members of the committee are appointed their names will be announced in the *Journal*. In the meantime, Mr. Tiedeman will welcome

suggestions from the membership as to how the committee can best serve the purpose for which it was created.

NEW SECTION ON SCHOOL HEALTH

It will be recalled that the Governing Council at the 71st Annual Meeting in St. Louis authorized the creation of a new Section on School Health and, in accordance with this resolution, the Executive Board has designated the following persons to constitute a Section Council to hold office until the close of the next Annual Meeting, at which time the regular routines can be established.

The following Council was recently authorized:

Chairman: Leona Baumgartner, M.D., New York, N. Y.

Vice-Chairman: Jessie M. Bierman, M.D., M.P.H., San Francisco, Calif.

Secretary: George M. Wheatley, M.D., New York, N. Y.

Section Council: Ruth E. Grout, Ph.D., Washington, D. C.; Hortense Hilbert, R.N., New York, N. Y.; Harold H. Mitchell, M.D., Astoria, Long Island, N. Y.; N. P. Neilson, Ph.D., Washington, D.C.; George T. Palmer, Dr.P.H., New York, N. Y.

Dr. George M. Wheatley, Secretary, in conference with the members of the Council, is planning a program for the meeting to be held in New York, N. Y., on October 12 to 14, 1943.

Members who wish to affiliate with the new Section should so advise the Central Office.

A.P.H.A. MEMBERSHIP RECORD

Elsie A. Siemer, of the A.P.H.A. staff and in charge of the Membership Department, has announced that the month of March, 1943, has broken all membership records for the A.P.H.A., with 207 new members listed.

According to Miss Siemer, this has grown out of the excellent coöperation afforded by members and Fellows of

the Association in returning the lists of suggested new members.

SPARE COPIES OF THE JOURNAL NEEDED

Readers are asked to address spare copies of the July, 1941, August, 1941, and January, 1942, issues of the *American Journal of Public Health* to the offices of the Association, where they will be most welcome.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Guy B. Anderson, M.D., Health Department, Ellicott City, Md., Deputy State Health Officer and Howard County Health Officer
 Paul Auger, M.D., D.P.H., Vercheres, Que., Canada, Medical Officer of Health for Vercheres County
 Herman M. Baker, M.D., 24 N.W. Fourth St., Evansville, Ind., Member, State Board of Health
 Jean Paul Beaudet, M.D., D.P.H., 1352 rue Royale, Trois-Rivieres, Que., Canada, Medical Officer, Trois-Rivieres Health Unit
 Marc Bergeron, M.D., D.P.H., 2313 Laframboise, St. Hyacinthe, Que., Canada, Medical Officer, St. Hyacinthe Health Unit
 Joseph A. Blais, M.D., D.P.H., Health Unit, Thetford-Mines (Megantic), Que., Canada, Medical Officer, Thetford-Mines Health Unit
 Dr. Antonio Bossinotte, Ministry of Health, Quebec, Que., Canada, Chief of Public Charities Bureau
 David E. Brown, M.D., 2739 Broussard St., Baton Rouge, La., State Health Officer
 Martin F. Buell, M.D., Municipal Building, Dearborn, Mich., Health Officer
 Thomas K. Chandler, M.D., Tunica County Health Dept., Tunica, Miss., Director
 Herbert H. Cowper, M.D., M.P.H., 116 W. Temple St., Rm. 702, Los Angeles, Calif., Director, Venereal Disease Control Division, City Health Dept.
 A. Avellin Dalcourt, M.D., D.P.H., 56 Notre Dame, Louisville, Que., Canada, Medical Health Officer, Maskinonge County Health Unit
 Arthur T. Davis, M.D., Courthouse, Riverhead, N. Y., Suffolk County Commissioner of Health
 Waldo F. Desmond, M.D., Main St., Newtown, Conn., Health Officer.

Francis E. Dill, M.D., City Hall, Abilene, Tex., Director, Abilene-Taylor County Health Unit
 Edward P. Dunne, M.D., Main St., Unionville, Conn., Health Officer
 Thomas S. Englar, M.D., M.P.H., E. Market & Fifth Sts., Charlottesville, Va., Health Officer, Joint Health Dept.
 Samuel S. Farago, M.D., 101 West Broad St., Westerly, R. I., Health Officer, Pawcatuck-No. Stonington, Conn.
 J. Russell Frantz, M.D., M.P.H., 1219 Divver St., Marysville, Calif., Health Officer, Sutter-Yuba Bi-County Health Dept.
 Jacques Gauthier, M.D., D.P.H., 603 rue Notre Dame, Cap-de-la-Madeleine, Que., Canada, Medical Officer of Health, Ministry of Health
 Daniel C. Hackett, M.D., P. O. Box 426, Elizabeth City, N. C., Health Officer, Pasquotauk-Perquimaus District Health Dept.
 Ira J. Hain, M.D., City Hall, Reading, Pa., Health Officer
 Fred J. Hamernik, M.D., Pine Ridge Hospital, Pine Ridge, S. D., Senior Physician, U. S. Indian Service
 Austin Hogan, M.D., 10 S. William St., Johnstown, N. Y., Health Officer and School Physician, Towns of Ephratah and Caroga
 Romelee A. Howard, M.D., Hubbard Hospital, Nashville, Tenn., Medical Officer (Acting Assistant Surgeon), U. S. Public Health Service
 J. Francois E. Labrecque, D.P.H., 81 rue du Pont, Hull, Que., Canada, Medical Officer, Hull County Health Unit
 Julius J. Layer, Lieut., M.C., U. S. Naval Training Station, Sampson, N. Y., Sanitation Officer, U. S. Naval Reserve

- Richard W. Lippman, Lieut., M.C., A.P.O. 864, c/o Postmaster, New York, N. Y., Venereal Disease Control Officer, U. S. Army
- Grace E. Lutman, M.D., M.P.H., State Office Bldg., Hartford, Conn., Child Hygiene Physician, State Dept. of Health
- Peter W. Masi, M.D., Wurtsboro, N. Y., Health Officer
- Hugh C. McRee, M.D., Hamilton, Ala., Marion County Health Officer
- Hazlett A. Moore, M.D., R.F.D. 1, Oxford, Ohio, Butler County Health Commissioner
- Oran A. Moser, M.D., Rocky Hill, Conn., Health Officer
- Owen L. Murphy, M.D., Simsbury, Conn., Health Officer
- Roger Nadeau, M.D., D.P.H., County Health Unit, Richmond, Que., Canada, Medical Health Officer
- Charles R. Ozias, M.D., Houston, Mo., Texas County Health Officer
- Blair Points, M.D., 318 City-County Bldg., Provo, Utah, P.A. Surgeon (R), U. S. Public Health Service, and Director, State District Health Office No. 4
- Emile Poisson, M.D., D.P.H., Box 159, Victoriaville, Que., Canada, Medical Health Officer, Arthabaska Health Unit
- Philippe Poliquin, M.D., D.P.H., Maniwaki Co., Gatineau, Que., Canada, Medical Health Officer, Gatineau County Health Unit
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 Madero N. Bader, D.V.M., 417 11th St., Galveston, Tex., Instructor, Medical Branch, Univ. of Texas

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St., Farmville, Va., Venereal Disease Control Officer, U. S. Public Health Service

Helen L. Walker, R.N., 2113 N. University, Peoria, Ill., Social Worker, Dept. of Health

Arthur R. Zintek, M.D., State Office Bldg., Madison, Wis., District Health Officer, State Board of Health

Unaffiliated

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Myron D. Miller, M.D., Franklin County Tuberculosis Hospital, Columbus, Ohio, Superintendent and Medical Director

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Anthony H. Nikiel, M.D., 12 Cottage St., Lynn, Mass., School Physician, City of Lynn

Victor Siegel, M.D., New Jersey Sanitarium, Glen Gardner, N. J., Resident Physician

William R. Smith, D.V.M., 610 S. 10th, Las Vegas, Nev., Sanitarian, Clark County Health Dept.

DECEASED MEMBERS

J. S. Abbott, Washington, D. C., Elected Member 1925, Elected Fellow 1929, Food and Nutrition Section

Richard M. Bradley, Boston, Mass., Elected Member 1920, Engineering Section

James M. Brannon, Ph.D., Urbana, Ill., Elected Member 1929, Laboratory Section

C. B. Crittenden, M.D., Louisville, Ky., Charter Fellow 1923, Health Officers Section

Lt. Col. Joseph M. Curry, V.C., Keesler Field, Miss., Elected Member 1937, Elected Fellow 1942—Unaffiliated

Hazel M. Hatfield, M.D., New York, N. Y., Elected Member 1920—Unaffiliated

William Thau, M.D., Boston, Mass., Elected Member 1937, Maternal and Child Health Section

NATIONAL HEALTH HONOR ROLL

Names of 33 cities and counties in 18 states winning awards in the 1942 National Health Honor Roll have been announced by the United States Chamber of Commerce and the American Public Health Association, which jointly sponsor this annual competition in community health promotion and preservation.

Those cities which attained the 1942 National Health Honor Roll are:

Baltimore, Md.
 Detroit, Mich.
 Evanston, Ill.
 Greenwich, Conn.
 Hackensack, N. J.
 Hartford, Conn.
 LaSalle-Peru-Oglesby, Ill.
 Madison, Wis.
 Milwaukee, Wis..
 Newton, Mass.
 Peoria, Ill.
 Racine, Wis.
 Reading, Pa.

Gibson County, Tenn.
 Glynn County, Ga.
 Jones County, Miss.
 Lauderdale County, Miss.
 Louisville-Jefferson County, Ky.
 Madison County, Ky.
 Memphis-Shelby County, Tenn.
 Olympia-Thurston County, Wash.
 Saginaw County, Mich.
 Sanilac County, Mich.
 Santa Barbara County, Calif.
 Van Buren County, Mich.
 Washington County, Miss.
 Whitman County, Wash.

Those counties which attained the 1942 National Health Honor Roll are:

Arlington County, Va.
 Davidson County, Tenn.
 El Paso County Tex.
 Fayette County, Ky.
 Forsythe County, N. C.
 Gallatin County, Mont.

Awards were presented to the winners during the Chamber's annual meeting, held in New York, April 27 to 29.

The National Health Honor Roll is financed jointly by the W. K. Kellogg Foundation and the Metropolitan Life Insurance Company.

Advertisement

Opportunities Available

PUBLIC HEALTH PHYSICIANS—(a) Assistant director of health; relocation community; public health training desirable; Southwest. (b) Physician to take charge health association operating small hospital; \$400, partial maintenance; Arizona. (c) Director of district health department; training or experience in public health, preferably in administrative side, desirable; \$4,500, plus traveling allowance. (d) Clinician; venereal disease clinic; patients average 1,000 weekly; Southeast. (e) Public health physician; mostly venereal disease work; vicinity Washington. (f) City health officer; town of 10,000 located in the Shenandoah Valley; will have as assistants full-time nurse and sanitary officer. (g) Industrial physician; construction project; Alaska; \$4,000, maintenance; transportation. (h) Field position; state department of health; should be effective public speaker; will provide health training if not trained; Midwest. (i) Public health appointment; \$250, including traveling expenses; South. PH3-1. Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

PUBLIC HEALTH NURSES—(a) Public health nurse; minimum year's experience in recognized health department; Northern California. (b) Public health instructor; fairly large hospital; East. (c) Public health nurse; two-county health department; generalized program; staff consists of director, sanitarian, four staff nurses, three clerks; must be able to drive; \$1,800 plus car allowance. (d) College nurse; approximately 1,500 students; public health certificate required; \$2,000; West. (e) Public health supervisor; graduate nurse with public health certificate and considerable executive experience required; \$2,200; West. (f) Resident nurse; young women's college; Midsouth. (g) Staff nurse; state department of health; South; if not trained will provide training during which time salary will be received. PH3-2. Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

Southern state department of health seeks several obstetric and pediatric consultants, requiring a minimum of a year's residency in a specialty, immunity to draft and preferably training in public health. Men and women are eligible. Salary \$300 per month plus travel. Apply Box C, Employment Service, A.P.H.A.

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are

expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Wanted: School Dental Supervisor to administer and operate dental program in City schools and clinics in City 50,000 population. Salary \$3,000 to \$3,600 with travel allowance. Those interested should address Dr. W. A. Browne, City Health Department, Alexandria, Va.

The Milwaukee City Service Commission announces an examination for assistant chief in charge of sanitary inspection. Salary first year \$210 per month increasing by \$10 increments annually until a maximum of \$260 per month is reached. Applicants must be citizens of the United States, between 25 and 45 years of age. Those interested may communicate with the Milwaukee City Service Commission, Room 716, City Hall, Milwaukee, Wis.

Sanitarian wanted in county of 28,000 in Midwest. Salary \$1,800 plus \$500 travel. Must own car. Complete supervision and execution of sanitation program, including milk, water, food-handling, etc., and general sanitation of environment in county. Address Box I, Employment Service, A.P.H.A.

Merit System for Personnel Administration, Delaware, is accepting applications for position of Deputy State Health Officer in Delaware State Board of Health. Salary range \$3,600 to \$4,200. Applications accepted until further notice. Those interested should communicate with Merit System Supervisor, P. O. Box 1911, Wil-

mington Delaware, or State Board of Health, Dover, Del.

Sanitarian wanted: Starting salary \$1,800 per year with travel allowance of \$50 per month. Man must have own car. Bachelor's degree followed by at least one year's course or its equivalent in subjects necessary for one entering the public health field, or an engineering degree plus one year's experience in sanitary or public health engineering required. A course in public health training may be considered as an equivalent for a part of the experience requirement. Apply Dist. Dept. of Health No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Notice of an expected vacancy for an Industrial Hygiene Engineer in the Los Angeles County Health Department has been received. Those interested should communicate with Dr. H. O. Swartout, Acting County Health Officer, Los Angeles, Calif.

Announcement is made of the following examinations to be held by the State Personnel Board, Seattle, Wash., for positions in the State Department of Health and County Health Departments:

| Position | Salary Range | |
|--|--------------|---------|
| | Entrance | Maximum |
| Bacteriologist | \$135 | \$160 |
| Laboratory Assistant .. | 125 | 145 |
| District Public Health Officer, II | 325 | 425 |
| Public Health Nurse .. | 145 | 170 |
| Asst. Venereal Disease Investigator | 150 | 190 |
| General Sanitarian | 160 | 200 |
| Milk Sanitarian | 160 | 200 |
| Chief of Public Health Education | 275 | 335 |
| Senior Milk Sanitarian | 190 | 230 |
| Obstetric Consultant .. | 375 | 450 |
| Pediatric Consultant .. | 375 | 450 |
| Senior Bacteriologist .. | 160 | 200 |
| Assistant Sanitarian (Open to Men and Women) | 125 | 150 |

Residence in the State of Washington is not required. Applicants must be citizens of the United States. Persons interested may secure application forms from the State Personnel Board, 1209 Smith Tower, Seattle, Wash.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

Physician, age 36, M.D. Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. A-476

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. A-505

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as city or county health officer or director of a bureau. A-506

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and bacteriologist and serologist in syphilis and enteric diseases. L-465

M.D., Dr.P.H., now a practising physician, chief of a clinic, diplomate in his specialty, professor in a medical school, ineligible for military service but in good health, wishes to make a change in his work and be employed in war industry. A-504

NEWS FROM THE FIELD

EXTENSION OF PUBLIC HEALTH COVERAGE TO THE NATION

Editorial, J.A.M.A., April 3, 1943

"Forty million of our people live in communities or in areas in which there is no access to the full-time services of a professionally trained medical officer of health and the associated sanitarians and public health nurses of a local health department of civil government. On June 10, 1942, the House of Delegates of the American Medical Association unanimously voted its approval of extension of such services. Now the Committee on Administrative Practice, one of the standing committees of the American Public Health Association, has offered a plan to improve the situation.

"Tax supported public health services have been distributed unevenly and not in all respects in relation to sanitary needs or in proportion to the population units of local government. In fact, there are conditions of local government, cities, townships and counties, in which duplicating and to some extent conflicting health services are provided because of local rivalries of a political nature. State laws in some instances do not authorize co-operative arrangements for a single health officer for adjacent communities or counties. Good health service for prevention of communicable, occupational, nutritional and other preventable diseases, and for the protection of the health of mothers and children, cannot be achieved for a state solely or effectively or economically by a state department of health unless the counties and cities are sufficiently concerned with local health conditions to support their own community health services. By the same token federal programs for a higher level of national health fail in

effectiveness for lack of facilities of local government through which federal grants can be used by agreement with the state.

"In July, 1942 some 62 million people living in the continental United States were provided by local governments with full-time medically officered health protection. In addition 16½ million persons were served by county or district health departments operated by a state department of health, and about 12 million more people living in cities with full-time health services. There remain 41,052,600 persons, or 31 per cent of our population, in 1,687 counties in 41 states for whom no full-time health service is provided by either local or state government.

"The committee of the American Public Health Association presents a half dozen basic principles of health administration and suggests that not more than 1,127 units of local health jurisdiction are needed for the total coverage of the continental United States. The units are, of course, in addition to the respective state departments of health and the health services of the various bureaus and departments of the federal government. It is to be assumed that a city and the county within which it is located shall have a single headed health service. It is suggested that a unit of less than 50,000 population can rarely maintain an efficient tax supported local health service and that counties with small populations should be authorized by state law to combine with adjacent counties to support and be served by a single district or multi-county health department.

"Among the 3,070 counties of our

states there are many with populations so small and economic resources so slender as to preclude the possibility of supporting even the minimum personnel and functions of a local health department. The basic public health law of each state should not only permit but specifically authorize the creation of local health units of population size and area compatible with efficient and economical public service. The law should provide furthermore for the selection of professional personnel on a sound civil service or merit system and authorize the levying of taxes to support the health services.

"The American Public Health Association, through its Subcommittee on State Health Administration, has recently completed a study of state health administration in Illinois, undertaken at the request of the state director of public health with the approval of the governor. A summarized report of this study discloses a recommendation that legislation be enacted to permit the establishment of full-time county or combination of county health departments. Following a distribution of this report, the Research Department of the Illinois Legislative Council made available a factual study of county health departments in the state for use by the general assembly in considering any legislation that might be proposed. Now a bill has been introduced by Senator Searcy as S. 244, authorizing the establishment and maintenance of county and multiple county health departments in the state.

"Permissive in form, this legislation proposes that county full-time health departments may be created either by resolution of a county board or by the voters of a county and that multiple county health departments may be set up. If four or more counties wish to associate themselves in establishing and maintaining such a department, prior approval must be obtained from the

state department of public health. Provision is made for the levying of a special tax not to exceed 1 mill on the dollar on all taxable property in the county or counties involved to finance the operation of the department. Existing full-time health departments in cities, villages or public health districts with less than 500,000 inhabitants may be retained or they may be abandoned and become integrated in the county or multiple county health department. Health departments in communities with a population of 500,000 or over will apparently not be affected by the bill. Each county health department will be managed by a board of health appointed by the president or chairman of the county board. At least two members must be physicians licensed in Illinois to practice the healing art in all its branches and at least one member must be a dentist licensed in Illinois. All members must be chosen for their special fitness for membership on the board. Multiple health departments are to be managed by a board of health consisting of three members appointed from each county by the president or chairman of the county board.

"Provision is made for the appointment of medical, dental and nonmedical advisory committees and for the appointment, for each department, of a chief medical officer to act as executive officer, and of such other officers and employees as may be approved by the executive officer, all appointees to meet the qualifications prescribed by the Illinois State Civil Service Commission. The functions to be exercised by the departments are set forth in broad groupings, including the right to pass such rules as may be necessary for the improvement and protection of the public health. The people of Illinois may well reflect on the importance of this proposal, establishing as it does a framework on which may be con-

structed a comprehensive public health program to function in the interest of the health of all the people of the state. Legislation with a similar objective, although differing in detail and approach, was proposed this year in the states of Arkansas, Georgia, North Dakota, Utah, Washington and Wyoming.

"Each state medical society may with advantage avail itself of the detailed information in the hands of the American Public Health Association and analyze its own situation in conference with its own state health officer. Permissive or enabling legislation to provide for local health units and their support should be supported by the professional influence of the physicians of the state, unless existing laws are adequate.

"The career of public health as a specialty of medicine requiring graduate university training and practical experience is so far accepted as part of the pattern of preventive medicine that the survival of the part-time general practitioner as the local administrator of a health department cannot be encouraged by the medical profession or be recommended to the taxpayer as the best his money can buy in public health."

FORTY-FIRST ANNUAL MEETING STATE AND TERRITORIAL HEALTH OFFICERS

The 41st Conference of State and Territorial Health Officers with the U. S. Public Health Service was held March 24 in Washington and was opened by Surgeon General Thomas Parran.

The Annual Conference is an outgrowth of the coöperative program established many years ago by the federal agency with the states for the control of epidemic diseases. On this foundation of state responsibility and federal assistance, the national public health program of the United States has been

established. At the yearly conference, the Public Health Service presents the states with a summary of current problems of nation-wide significance. The State and Territorial Health Officers in turn discuss mutual problems and present recommendations for their solution to the Surgeon General.

In opening the Conference, Dr. Parran reported that, despite difficulties in obtaining critical materials for the construction of community health facilities recommended by the Public Health Service, 153 hospital and health center projects and 372 sanitation projects were either completed or nearing completion on February 15, 1943.

The Surgeon General warned the health officers that if the government finds it necessary to move a large number of farm workers into certain areas this year for the production of food crops, the need for rural health and medical services will be intensified. "Until the scope and organization of such a plan are clearly defined, it is impossible to say just what it will entail," he said, "but we must obviously be prepared to assume responsibility in whatever program is evolved."

Assistant Surgeon General Joseph W. Mountin, in charge of the States Relations Division, told the Conference that the Public Health Service has recommended to the Budget Bureau the appropriation of federal funds totalling \$34,399,521 for federal-state coöperative health work in the fiscal year 1943-1944. This sum includes regular appropriations for health activities under Title VI of the Social Security Act and under the National Venereal Disease Control Act, as well as emergency appropriations for health services directly connected with the war effort. The latter include malaria and yellow fever control around military establishments where these diseases are prevalent, industrial hygiene services, tuberculosis control in war industries, and

protection of municipal water supplies from sabotage.

Dr. Mountin also called upon the health officers for greater financial participation by state and local governments in protection of the public health during the emergency. State and local health departments may expect to lose more personnel as the needs of the armed forces increase. The state health departments of North Carolina and Tennessee were cited by Dr. Mountin as the only ones which have anticipated this contingency by organizing state-wide programs to recruit and train new personnel as substitutes for permanent employees who have gone into military service or other employment.

NATIONAL HEALTH SERVICE IN BRITAIN
—A REPORT OF THE BRITISH SOCIETY
OF MEDICAL OFFICERS OF HEALTH

Public Health, the Journal of the Society of Medical Officers of Health, London, in the January, 1943, issue carried a report on the national health service as it should be, as prepared by the Society. The foreword points out that health is a national asset and every member of the community should be entitled to the best possible health and its minimum disturbance by disease or any adverse condition. The Society was established in 1856 for the advancement of public health. In September, 1941, the Society set up a Medical Planning Committee to consider how the health of the nation could be best secured. An interim report was prepared which has finally resulted in this report on a national health service as a contribution by professional men and women with wide experience in planning for health.

An introductory section describes the present governmental functions in Great Britain as they relate to health.

Having regard to these provisions and the need for their coördination and expansion, what is required is that in any local government area there should be a single authority

for health purposes. Such an authority would be responsible within its area for the administration of medical, health and allied services, including the environmental and personal health services, and be further responsible for the provision of an adequate hospital service for all the inhabitants of its area.

In the new organization of medicine it cannot be too strongly emphasized that it will be general practitioners or groups of practitioners who will be in the first lines of defense against the encroachment of disease and for the maintenance and improvement of health. The family should be regarded as the health unit, and practitioners should have the care in health as well as disease of suitable numbers of persons.

The report pictures a health center equipped for services of preventive and curative medicine, and points to the doctor as the essential element in the organization with facilities for giving effect for the purposes of national medicine, namely, to maintain and improve health, to prevent disease, and to treat disease and reestablish health. "The doctor in this organization becomes the real family doctor with full responsibility for the health of the persons under his care."

Hospital services are proposed as complete services able to deal with all forms and stages of invalidity. "Any suggestion to create *ad hoc* hospital authorities for the purpose of administering hospital services would create fresh confusion in a field where integration is essential." Both voluntary and municipal hospitals would be included and areas would be so arranged that at least one hospital will come to be regarded as a principal hospital. Provisions for teaching services are included.

All hospitals, voluntary and local authority, should be available for all members of the community on similar terms and conditions.

An adequate laboratory service forms an essential part of an efficient medical service and should be conducted so as to insure regular personal contacts between the staff of the laboratory, the officers engaged in epidemiology and other public health work, the clinical staffs of hospitals and the medical practitioners in the area.

It is proposed that staffs for the most part should be on a whole-time salary basis, though provision is also made for a capitation basis as under the National Health Insurance system and as well as part-time service on a salary basis.

It will take time for a new type of medical practitioner to be trained for the care of persons in health as well as disease. Hitherto the education and training of the medical practitioner have mainly had regard to the cure of disease. Future training must also embrace the study of the prevention of disease and the maintenance of health.

Having regard to the foregoing considerations it would appear that to avoid any unnecessary delay in the ultimate operation of the plan steps should be taken at the earliest possible moment: (1) To establish a new Health Ministry with health as its sole function; (2) to establish new Local Government Areas; and to give powers to the new Local Government Authorities to plan and develop their hospital, medical, health and allied services within their discretion and according to circumstances during the transition period.

Having regard to the probable state of medical practice immediately after the war, it is suggested that steps might be taken to ameliorate the post-war situation by empowering major local authorities to set up a whole-time salaried domiciliary service on lines which would ultimately fit into the scheme outlined in this report.

FOR BETTER MEDICAL CARE

Editorial, New York Times, April 2, 1943

"The American Public Health Association's Committee on Administrative Practice has issued a report* which deserves earnest consideration because it suggests a plan for the better distribution of medical care. As matters stand, 62 million of our continental population receive some medical attention from local governments, 16.5 million more from county or district health departments, and 12 million from municipal hospitals and health officers.

This leaves about 41 million for whom no full-time health service is provided. It is with this large fraction that the Association's report deals.

"The Association makes the point that in addition to existing agencies, 1,127 medical units are needed for the continental United States. This relatively small addition is held to be adequate if counties so sparsely settled that they cannot support a good health organization are willing to consolidate their funds and facilities and establish a single large unit for the benefit of the group. That this is no utopian proposal is made clear by a study of Illinois' needs.

"Legislation is proposed to permit counties to create group health departments, the permission to be obtained from the State Health Department. How is the money to be raised? By a tax of one mill on the property of counties involved. Communities of less than 500,000 inhabitants may either retain or abandon their health organizations as expediency dictates. Larger communities would not be affected at all.

"This plan clearly has its merits. The cost is not large, and there is nothing compulsory about it. In these days of the automobile and the bus, an adequate health organization should have no difficulty in covering hundreds of square miles. But does the plan go far enough? The sick too often need hospital care. And if there are to be hospitals they should be open to all qualified physicians. Moreover, some provision should be made for research in public health of the type in which this city has promised to engage, and for teaching. No sound medical plan can ignore the interrelation of practice, research and teaching."

DR. DOULL SERVING OVERSEAS

James A. Doull, M.D., Dr.P.H., Professor of Hygiene and Public Health, School of Medicine, Western Reserve

* Unit of Local Health Service—Progress Report, Committee on Local Health Units. Haven Emerson, M.D., Chairman. *A.J.P.H.*, 33, 4:404 (Apr.), 1943.

University, Cleveland, has recently undertaken an overseas mission for the Lend-Lease Administration. Dr. Doull is a member of the Executive Board of the American Public Health Association. He has been appointed Senior Surgeon (R) in the U. S. Public Health Service and assigned to the Lend-Lease Administration.

During the last World War Dr. Doull served in the Medical Corps of the British Army for four years and was awarded the Military Cross of Great Britain and the Croix de Guerre of France. He expects to return in about four months.

APPOINTMENT OF JUDICIAL COMMISSION ON BACTERIOLOGICAL NOMENCLATURE

At the Third International Congress of Microbiology held in New York City in September, 1939, a series of recommendations of the Permanent International Committees on Bacteriological Nomenclature were accepted at the plenary session of the Congress. The third and fourth recommendations were:

That the Nomenclature Committee, as at present constituted, shall continue to function under the auspices of the International Association of Microbiologists as it did under the International Society for Microbiology.

That the International Committee shall select from its membership a Judicial Commission consisting of twelve members, exclusive of members *ex officio*, and shall designate a Chairman from the membership of the Commission. The two Permanent Secretaries of the International Committee on Bacteriological Nomenclature shall be members *ex officio* of the Judicial Commission. The Commissioners shall serve in three classes of four commissioners each for nine years, so that one class of four Commissioners shall retire at every International Congress. In case of the resignation or death of any Commissioner, his place shall be filled for the unexpired term by the International Committee at its next meeting.

By prompt action at and subsequent to the Congress ballots were cast in spite of war conditions by 26 of the 62 members of the Permanent Committee

on Nomenclature. These ballots when examined by the undersigned joint Secretaries of the Permanent Committee in November, 1942, were found to have resulted in the selection of the persons whose names appear below. These are grouped in the three classes specified by the Permanent Committee, those receiving the highest number of votes being placed in the nine year class, those receiving the next highest in the six year class, etc. Names in the classes are arranged alphabetically.

Elected for nine years—(term normally expires in 1948). R. E. Buchanan (U.S.A.), A. J. Kluyver (The Netherlands), E. G. D. Murray (Canada), S. Orla Jensen (Denmark). *Elected for six years*—(term normally expires in 1945). J. Howard Brown (U.S.A.), A. R. Prévot (France), J. Ramsbottom (Great Britain), Th. Thjötta (Norway). *Elected for three years*—(term normally would have expired in 1942). A. Lwoff (France), R. Renaux (Belgium), A. Sordelli (Argentina), C. Stapp (Germany).

It has been decided to make this announcement in the hope that some plan for taking tentative action on questions of nomenclature can be developed by those members of the Commission who can be reached under war conditions.

While no provision was made in 1939 for the contingencies that have arisen, it is felt that those elected should serve until successors are elected. Professor R. E. Buchanan has been asked to act as Chairman *pro tem* of the Judicial Commission as there is no possibility of securing an election under the rules as adopted.

R. ST. JOHN BROOKS
(London)

ROBERT S. BREED
(Geneva, New York)

Joint Permanent Secretaries
International Committee on
Bacteriological Nomenclature

DOES THE MEDICAL SHORTAGE AFFECT PUBLIC HEALTH?

On March 29 the Office of War Information, Washington, released a survey of medical care in the United States which showed that between forty and forty-five thousand doctors had entered the armed services, constituting approximately one-third of the doctors in active full-time practice. A review of the situation in some 60 communities in 20 states where shortages of doctors have been reported included areas in farming regions, mushroom towns and larger cities. The following conclusions were reached by the report.

1. Although there are areas critically in need of doctors because of withdrawals for the armed forces—a need frequently increased by expansion of population for war industry—so far the health of the nation as a whole has not been seriously impaired by the doctor shortage. Doctors these days are not only working overtime; they are—most of them—working practically all the time and in total disregard of their own health.

2. The number of communities critically in need of doctors is not great compared with the total number of communities in the United States. Those in need, however, are among those most vital to our war program.

3. In too many cases physicians were recruited for the armed services without sufficient regard for the welfare of the civilian population. There are, however, enough doctors remaining in private practice to give adequate care to the civilian population, provided they can be properly distributed numerically and according to special abilities.

4. The voluntary relocation of physicians from communities where there is an abundance of doctors to areas in acute need of doctors has proved extremely difficult, and has not resulted in a solution of the problem.

5. In some communities local medical groups have resisted attempts to relocate outside doctors in their locality.

6. The situation as a whole is not now out of control, but unless remedial steps are taken soon it will grow progressively worse. More physicians will be recruited for the armed forces and doctors in critical areas—many of them elderly—may succumb to exhaustion from overwork.

7. Luxury medicine, to which some Americans have become accustomed, is out for the duration. We can no longer afford to call

doctors for imaginary ailments, and we must make the best and most efficient use of the medical facilities we have.

8. Medical shortages are not due in all cases to the war, although frequently the war has intensified them. For instance, many rural areas have never had a sufficient number of doctors. It is not the purpose of this report to recommend that long-standing problems be solved in time of war except as they relate to our progress toward victory.

The Office of War Information has announced that the material will be assembled in a booklet and made available to health workers on request.

DENTISTS IN INDUSTRY

What was said to be the first meeting of dentists interested in dental programs in the industrial field was held in Chicago on February 22, under the auspices of the Committee on Economics of the American Dental Association. An organization was formed, the next meeting to be held in Cincinnati next October. The following were elected officers:

Chairman—E. S. Arnold, D.D.S., Traveler's Insurance Company, Hartford, Conn.

Secretary—R. M. Walls, D.D.S., Chairman, Committee on Economics, American Dental Association

Advisory Board—Ernest Goldhorn, D.D.S., Dental Director of the Pullman Standard Car and Manufacturing Corporation; R. C. Dalgleish, D.D.S., Dental Director, Utah State Board of Health; Frank Haughton, D.D.S., Dental Director, Medical Center, Jersey City, N. J.; Hugo M. Kulstad, D.D.S., Member of Council on Dental Health of the American Dental Association and Chairman of Council's Committee on Industrial Dental Programs; L. D. Heacock, D.D.S., Dental Surgeon (R) U. S. Public Health Service, Division of Industrial Hygiene, National Institute of Health; Robert S. Sprau, D.D.S., Dental Adviser, Kentucky State Health Department

Several papers were presented and Dr. Carl Peterson—Secretary of the Council on Industrial Health of the American Medical Association—presented the problems encountered by the medical group when they first entered

the industrial field. Basic objectives for dental programs in war industries were outlined.

OFFICE OF FOREIGN RELIEF AND REHABILITATION OPERATIONS

Herbert H. Lehman, former Governor of New York State and now Director of the Office of Foreign Relief and Rehabilitation Operations of the Department of State, Washington, announced recently the circumstances under which the Advisory Committee on Health and Medical Care had been set up under the Chairmanship of Surgeon General Thomas Parran of the Public Health Service.

The Office of Foreign Relief and Rehabilitation Operations has recognized from the outset the necessity of planning and executing an extensive medical and health program in theaters of relief operations. Almost from the outset of our operations, the several governmental agencies concerned with the various aspects of public health and medical care were asked to provide their assistance. A number of these agencies have been working on these problems in advance of the creation of the Office of Foreign Relief and Rehabilitation Operations.

In establishing this Committee I asked it to undertake the following work:

1. To collect and analyze available information concerning disease prevalence and important health problems in areas which may be reoccupied by our armed forces.
2. To appraise the epidemic and other disease conditions which are likely to be an important part of relief and rehabilitation.
3. To estimate the amount and kinds of essential health and medical supplies and equipment which must be provided.
4. To consider—at least in general terms—the numbers, skills and potential sources of personnel needed to deal with epidemic and other health problems.
5. To consider, in conjunction with appropriate agricultural and other sources of information, the nutritional problems ahead.
6. To advise the Director of Foreign Relief and Rehabilitation upon request concerning other aspects of public health as the occasion requires.

In addition to the Chairman, Dr. Parran, the Committee now includes:

Colonel James S. Simmons U. S. Army; Commander T. J. Carter, U. S. Navy; Dr. Martha Eliot, Children's Bureau; Dr. Alfred Cohn, Board of Economic Warfare; Professor C.-E. A. Winslow, Yale University School of Medicine; Dr. Frank G. Boudreau, Director of the Milbank Memorial Fund; Selskar M. Gunn, Vice-President of the Rockefeller Foundation, and Dr. James A. Crabtree.

Governor Lehman also announced the appointment of Dr. James A. Crabtree as Chief Medical Officer of the Office of Foreign Relief and Rehabilitation Operations. Dr. Crabtree is loaned from the U. S. Public Health Service where he has served for the past 2 years as Secretary of the Health and Medical Committee of the Office of Defense Health and Welfare Services. He has also been the medical consultant in the Office of Lend-Lease Administration. He was formerly connected with the Tennessee State Health Department and was Deputy Medical Director of the Tennessee Valley Authority.

It was also announced that 3 Public Health Service medical officers had been assigned to North Africa and will depart for the field as soon as transportation facilities are available, representing the OFRRO. They are Drs. Dudley A. Reekie, Dorland J. Davis, and Michael L. Furcolow. Dr. Reekie is assigned as chief medical adviser to Robert L. Murphy, the Chief Civilian Affairs Officer on the staff of General Dwight E. Eisenhower. Mr. Lehman said that the dispatch of the 3 Public Health Service officers into the North African Field will strengthen the personnel of the OFRRO which has been in Algeria and French Morocco since January, 1943. Under the direction of Fred K. Hoehler, formerly the Director of the American Public Welfare Association, the OFRRO is making preparations for extension of relief to distressed civilian populations in Tunisia.

In commenting on the preparatory

work already accomplished by the Advisory Committee, Mr. Lehman said:

The War Department has not only assigned Colonel Simmons as its representative on the Advisory Committee but has also designated Colonel Ira V. Hiscock as Liaison Officer.

For many months, the Lend-Lease Administration has been making an estimate of drugs and medical supplies which may be needed after the liberation of occupied countries. The full coöperation of the National Research Council has been available in this work.

The Children's Bureau is contributing technical aid on child care and maternity problems. Through Dr. Boudreau of the Food and Nutrition Board of the National Research Council, the best scientific advice has been available concerning nutrition problems.

The American Red Cross is coöperating. Initial activities of the Office of Foreign Relief and Rehabilitation Operations in North Africa consisted of distribution of considerable supplies of powdered milk through child feeding stations, undertaken through the Red Cross. The Red Cross additionally has undertaken to supply certain laboratory and health supplies.

It was apparent that much necessary information concerning public health problems in countries likely to be reoccupied already was available in various departments in Washington and in data compiled by the Rockefeller Foundation. This information has been assembled, digested and interpreted, country by country, during recent months.

For many years the U. S. Public Health Service has assembled current reports on communicable diseases through the Offices of all American Consuls. The Advisory Committee on Health and Medical Care now has received this information, together with additional data available from the Army and Navy.

In order to deal with special problems, a number of subcommittees have been appointed. These include the following:

Nutrition, under Chairmanship of Dr. Boudreau and including Dr. Russell Wilder, Dr. W. H. Sebrell, Colonel Paul E. Howe, and Harold A. Vogel.

Sanitation of Environment, under Chairmanship of Dr. C.-E. A. Winslow, and including Dr. Abel Wolman, Colonel William A. Hardenbergh, and Senior Sanitary Engineer John J. Hoskins.

Maternal and Child Health under Chairmanship of Dr. Martha Eliot, and including Dr. Henry F. Helmholz, Dr. Edwards A. Park, Dr. Nicholson J. Eastman, Dr. Clifford Grulee, and Dr. Joseph Stokes.

Tropical Diseases, under Chairmanship of

Colonel Simmons with other members to be selected later.

Mr. Lehman said that Surgeon General Parran and members of his Committee have been in communication with a comparable group in Great Britain, which is organized under the Inter-Allied Post-War Requirements Committee.

Uniform standard lists of essential drugs are being agreed upon and information is being exchanged between my Committee and the London group. Dr. Melville MacKenzie, Chairman of the London group, has been invited to come to the United States for discussions. Dr. Raymond Gautier of Switzerland, who is associated with the League of Nations, also has been invited to come here for a conference concerning health matters.

In the field of health, as in other sectors of the task of bringing relief and rehabilitation to the liberated peoples, it is apparent that there will be needed not only the full participation of governments but also of all voluntary agencies and foundations experienced in this field. The task will be so tremendous that even the combined efforts of government and private agencies will be unable to meet all the demands.

The task of healing the wounds of war should engage the full efforts of all the United Nations and all freedom loving people everywhere. When our victorious United Nations' armies complete the liberation of the suffering peoples, it will no longer be a question of how much we contribute out of our largess to aid the starving and the sick, but rather how completely we are willing to share our limited joint resources to aid the sick and the starving.

PLAN OF SOCIAL SECURITY FOR CANADA

First the Beveridge Report for providing social security for England; then the Report of the National Resources Planning Board with recommendations toward a similar objective in the United States; and now postwar social life in Canada is under consideration. A definite legislative proposal for compulsory nation-wide health insurance and a plan to assure a minimum standard income to everyone have been submitted by Pensions Minister Ian MacKenzie to the House of Commons Committee on Social Security. The health insurance

measure would provide medical and dental services, hospitalization and drugs, to be paid out of wages, income contributions, and public funds. The cost is estimated to be one billion dollars a year. The social security plan was prepared by Dr. Leonard C. Marsh. In laying it before the House of Commons Committee, Mr. MacKenzie suggested that gaps in existing social legislation, the biggest of which is in the field of health, should be filled in at once. The report proposes establishment of a basic minimum standard of income according to which all social aids would be fixed; adjustment to this standard of existing non-contributory old age pensions and lowering the pension age; national compulsory contributory health insurance with free treatment for all; payment of allowances to parents for children under 16; upward revision of benefits to persons with dependents; pensions for disabled persons and widows; and payment of funeral benefits.

It is interesting to note that the Canadian Medical Association, on January 18, approved the adoption of the principle of health insurance and "a plan of health insurance which will secure the development and provision of the highest standard of health services, preventive and curative, if such plan be fair both to the insured and to all those rendering the service."

NEW PUBLIC HEALTH LEGISLATION IN NORTH DAKOTA

F. J. Hill, M.D., Acting State Health Officer, Bismarck, N. D., recently summarized the new legislation from the 1943 session of the Legislature. Authorization has now been obtained in an important new act for two or more adjacent counties or city-county units to pool their funds in order to create full-time local health units. Another law raises the minimum salary of the state health officer from \$4,200 to

\$5,000 and increases his term of appointment from 2 years to 4 years.

Another bill provides for the registration of engineers in order to protect the public against incompetent engineering services in the construction of public and private utilities, structures or equipment involving the safeguarding of life and the protection of property.

A law has been passed which reduces the number of local registrars from over 2,000 to a total of 65 in order to facilitate the issuing of birth and death certificates. Any citizen in North Dakota now may have a judicial determination of his birth record. According to Dr. Hill, this is a valuable procedure to determine birth confirmation for residents of foreign origin.

CHANGES IN MEDICAL OFFICERS, O.C.D., WASHINGTON

A. William Reggio, M.D., Boston, recently State Chief of Emergency Medical Service for Massachusetts, has been appointed Regional Medical Officer for the First Civilian Defense Region, succeeding Dudley A. Reekie, M.D. Dr. Reggio, a graduate of Harvard Medical School, was formerly an instructor in surgery at Harvard Medical School; assistant visiting surgeon, Massachusetts General Hospital, and consulting surgeon at the Massachusetts Eye and Ear Infirmary. The First Region includes the New England States.

Dr. Reekie, who was assigned to the Central Office of the Medical Division in Washington in January as Acting Chief of the Field Casualty Section, has since been assigned by the Surgeon General of the U. S. Public Health Service to the U. S. State Department to head a group of Public Health Service officers who will act as special advisers on health matters to Robert Murphy, Chief Civil Affairs Officer for North Africa.

To succeed Dr. Reekie as Acting Chief of the Field Casualty Section,

H. van Zile Hyde, M.D., Regional Medical Officer for the Second Civilian Defense Region (New York, New Jersey and Delaware), has been transferred to Washington. Dr. Hyde, formerly of Syracuse, N. Y., was the first Civilian Defense Regional Medical Officer appointed, having taken office in August, 1941. John J. Bourke, M.D., Deputy State Chief of Emergency Medical Service for New York, is now acting Regional Medical Officer for the Second Region.

David D. Rutstein, M.D., medical gas officer on the Washington staff, has resigned to become Deputy Health Commissioner of New York City. Before he joined the Medical Division, Dr. Rutstein was chief of the Cardiac Bureau of the New York State Health Department, Albany, N. Y.

AMERICAN FILM CENTER ISSUES LIST OF HEALTH FILMS

"Health Films," a descriptive list of 219 selected motion pictures arranged under 38 subject classifications has been issued by the Section on Health and Medical Films of the American Film Center, Inc., 45 Rockefeller Plaza, New York, N. Y. The Center is a non-profit educational organization supported by a grant from the Rockefeller Foundation.

The films listed, with few exceptions, are for lay audiences and include films which seem to be of value in the teaching of health whether they are produced under commercial or other auspices.

The pamphlet is obtainable from the American Film Center at 25¢ per copy.

RELOCATION OF PHYSICIANS

The War Manpower Commission on March 30 announced that approximately 600 physicians have changed their places of residence and practice in the last few months. The Procurement and Assignment Service, a Division of the Bureau of Placement, War Man-

power Commission, makes an effort to accomplish such relocations when the medical needs of the civilian population would be better served.

Figures compiled by the Procurement and Assignment Service come from 40 of the 48 states. Of a total of 587 relocations in these 40 states, 340 were directly due to action by the Procurement and Assignment Service. Five of the relocated physicians are women. A total of 214 of the 582 relocated male physicians are either over 45 years of age, or, if younger, disqualified for military service.

Although it is known that there have also been relocations in Kentucky, Delaware, Louisiana, Minnesota, Virginia, West Virginia, Oklahoma, and Vermont, the figures have not been reported. In many instances, the Procurement and Assignment Service reported, the assumption of increased duties by a decreased number of physicians remaining in an area has been seen as the best solution to a community's health problem. In a number of states ingenious medical care plans have been worked out locally which enable fewer physicians to care for more civilians. Among such states are Maryland, California, Oregon, Michigan, and Arkansas.

The Procurement and Assignment Service has an organization in each of the nine Army corps areas, consisting, in each case, of a chairman, two physicians, two dentists, one veterinarian, one hospital representative, one medical education representative, and one public health representative. Also in each state there is a state chairman for medicine, for dentistry, and for veterinary medicine.

RETIREMENT OF SIR MALCOLM WATSON

In its report for 1942 on the work of the Alameda County Mosquito Abatement District, California, Harold F. Gray says:

In presenting this Annual Report we wish to pay tribute to Sir Malcolm Watson, LL.D., M.D., C.M., D.P.H., F.R.F.P.S., L.M.S., who at the end of 1942 retired as Director of the Ross Institute of Tropical Hygiene at the London School of Hygiene and Tropical Medicine.

His brilliant demonstration at Klang and Port Swettenham in Malaya in 1901, that malaria could be controlled under mosquito control measures, initiated a long and distinguished career in tropical hygiene, culminating in his eventual recognition as the world's

greatest malariologist. His work has been characterized by originality, keen observation, a willingness to experiment, an open mind receptive to new ideas, fertility in adaptation of means to an end, and practical ability to achieve substantial results in disease control within reasonable cost limits.

His work has been an inspiration to those who have labored in this field, and he has graciously and generously shared with us his vast knowledge and experience.

In a world torn with war and destruction, it is indeed a pleasure to acknowledge the services of one who has done so much for the health and welfare of the people. By men like him this world is blessed.

WEST VIRGINIA LEGISLATION

The *Monthly News Letter* of the West Virginia State Department of Health records the passage of an act tightening the provisions relating to the suppression of prostitution and the passage of an act creating a division of cancer control in the State Department of Health. Another act of the Legislature gives the State Department of Health authority to detain and treat any person believed to be suffering from any venereal disease.

The confirmation of the appointment by Governor Neely of Dr. C. F. McClintic as State Health Commissioner has been announced. Dr. McClintic has served since March, 1941, in the unexpired term of his predecessor, Dr. A. E. McClue.

ECUADOR IMPROVES MEDICAL AND NURSING FACILITIES

Nelson Rockefeller, the Coördinator of Inter-American Affairs, Washington, D. C., has announced that widespread attention to public health and sanitation in the American republics includes new hospitals, new dispensaries and health centers, and sewage disposal plants which are already under construction in widely separated areas. These undertakings in the other Americas are directed largely by the local authorities, with technical aid and, in some cases, with financial assistance

provided by United States Government agencies.

It is announced that recently 30 carefully selected students began a course of instruction in nursing at the Escuela Universitaria de Enfermeras Profesionales of Quito, Ecuador, as the first project of its kind to be inaugurated under the Inter-American health and sanitation program. This project is coöperative among various Ecuadoran and United States agencies. Students in the nurses training course will spend the first 4 months receiving classroom instruction before entering clinical training. The curriculum will enable them to meet the requirements of the International Council of Nurses and to receive international recognition in their profession. Coöperating are the Ministerio de Provision Social, the Asistencia Publica, Universidad Central, Dirección de Sanidad, Cruz Roja and Concejo Municipal, as well as the Pan American Sanitary Bureau, the Rockefeller Foundation, and the Comision Sanitaria Norteamericana. The United States teaching staff includes Anne Cacioppo, the director, Kathleen Logan and Dorothy Foley.

WESTERN HEMISPHERE PROJECTS IN HEALTH

Dr. Albert R. Dreisbach, Assistant Director of the Division of Health and Sanitation, Office of Inter-American Affairs, Washington, recently announced that missions from the United States to Central and South American countries are contributing money, equipment, and personnel in medicine and sanitation to promote the health of this hemisphere. He stated that the budget amounted to \$25,000,000 and that the health and sanitation work was under the direction of Brigadier General George C. Dunham, U. S. Army, who is assigned to the office of the Coördinator of Inter-American Affairs.

Dr. Dreisbach stated that at present

units of Dr. Dunham's mission are operating in 13 of the 20 other republics in the western hemisphere, including Costa Rica, Honduras, El Salvador, Guatemala, Nicaragua, Haiti, Bolivia, Ecuador, Paraguay, Peru, Brazil, Colombia, and Panama. The individual units, with one exception, are headed by physicians, with sanitary engineers as chiefs of staff. Most of the field work is carried on by local doctors and local personnel.

NEW YORK EMERGENCY FOOD COMMISSION

Governor Thomas E. Dewey has announced the appointment of an emergency food commission "to foresee and meet situations as they arise." Among the objects of the commission are to help New York farmers to obtain maximum production and to guide adaptation of New York citizens "with foresight and common sense" to necessary changes of diet. Among the members of the commission is Dr. L. A. Maynard, Director of the Cornell University School of Nutrition.

U. S. PUBLIC HEALTH SERVICE APPOINTS SANITARIANS

The U. S. Public Health Service announces that the title "Sanitarian" has been adopted for commissioned reserve officers whose education and experience are in fields allied to public health work, but not in the specific field of medicine, dentistry, sanitary engineering, or engineering. Comparable qualifications with regard to education and experience for each rank are demanded for all titles. This title will replace the titles of Chemist and Industrial Hygiene Engineer which have been given recently to some officers assigned to industrial hygiene work.

COMMITTEE ON SOCIAL PROTECTION

A recent meeting was held in Washington of the Executive Committee of

the National Advisory Police Committee on Social Protection which brought together key representatives of private enterprises coöperating with law enforcement officials in the campaign for repression of clandestine prostitution and sex delinquency. At the conference the Army announced that the venereal disease rate among its men in January, 1943, was 25.2 per thousand per year as compared to 45 during January, 1942.

Among the units represented at the conference were the American Hotel Association, representatives of taxicab organizations, and the Distilled Spirits Institute, representing the liquor industry. The chairman of the group was Charles P. Taft, Assistant Director of the Office of Defense Health and Welfare Services.

TRANSCRIPTS OF SANITARIANS' VISITS AVAILABLE

Instructors in schools offering courses in sanitation and those responsible for in-service training have long expressed a need for more practical teaching material. One way by which schools of social work have met a similar need is to use verbatim records of actual home visits, whereas teachers' colleges have used verbatim reports of classroom work. More recently, the nursing schools have had access to authentic home nursing visits. Verbatim transcripts of sanitarians' inspections of homes and business establishments are now ready for release to instructors of sanitarians by the U. S. Public Health Service.

A brief description of the procedure used to obtain them is presented here in order that the transcripts may be of greatest service to those wishing to use them. More than 500 transcripts were collected concerning the work of 40 sanitarians in two cities in which the health departments carry out diversified inspection programs. In the smaller

city every inspector participated, but in the larger, the division director selected at random for participation inspectors engaged in each phase of the department's inspection work.

Expert stenographers accompanied the inspectors and recorded all conversations between them and those with whom they made contact in the course of their calls. Inspectors were requested not to make any special selection of premises to be visited but to carry on their daily activities in the usual manner.

Although the original stenographic reports include samples of every type of inspection activity carried on by the departments, duplication facilities limit the collection available for distribution to 23 transcripts. They are not offered as representative of sanitary inspections all over the country; however, they do indicate problems that are common to most sanitarians. In addition to: (1) Complaint Investigations (of several categories), the following types of inspections were selected for publication, (2) Residence (house), (3) Eating Establishment, (4) Bakery, (5) Delicatessen, (6) Grocery Store, (7) Chicken Market, (8) Milk Plant.

Since the supply of copies is limited, distribution is necessarily restricted to instructors in departments offering courses in sanitation and educational directors of health departments and other health organizations. Requests for this material should be addressed to the U. S. Public Health Service, Division of Sanitary Reports and Statistics, Washington, D. C.

DR. GETTING APPOINTED MASSACHUSETTS STATE COMMISSIONER OF HEALTH

Governor Leverett Saltonstall has recently announced the appointment of Vlado A. Getting, M.D., Dr.P.H., as State Commissioner of Health for Massachusetts, succeeding Paul J. Jak-

mauh, M.D., who has served for several years.

Dr. Getting since 1942 has been Health Commissioner of the City of Worcester, Mass. He received his medical degree from Harvard and the M.P.H. and Dr.P.H. from the Harvard School of Public Health, the latter in 1940. Dr. Getting has served as research assistant in epidemiology and preventive medicine at the Harvard School of Public Health and the Harvard Medical School. He has served as District Health Officer, as Epidemiologist, and as Technical Director of the Mosquito Survey in the Massachusetts Department of Public Health. He is a Fellow of the Epidemiology Section, American Public Health Association.

PROPOSED HEALTH LEAGUE FOR THE CARIBBEAN AND GULF AREAS

In 1938 Domingo Ramos, M.D., formerly Minister of Health of Cuba and now the Director of the Finlay Institute, Havana, proposed the establishment of a traveling institute for the promotion of sanitary and epidemiological knowledge in the area of the Gulf of Mexico and the Caribbean Sea. Dr. Ramos presented his idea at the Florida Public Health Association in 1938 and at a later session of the Florida Association held in Tampa. On the latter occasion, Felix Hurtado, M.D., at present Undersecretary of Health of Cuba, presented an official offer from President Batista of Cuba designating the Finlay Institute of Havana as one of the terminal stations of the institute. It was later proposed that Miami University in Florida should be another terminal station. The project was subsequently discussed at the International Conference of Caribbean Countries held in Port au Prince, Haiti, and again at the time of the American Public Health Association

meeting in Atlantic City, N. J., in 1941.

Dr. Hurtado visited New York City in April in order further to discuss such a sanitary league. At this time he pointed out that the states of Texas, Louisiana, Mississippi, Alabama, and Florida border on this region and that the relationships of these states and their ports with Cuba, with Mexico, with Guatamela, Honduras, Salvador, Nicaragua, Costa Rica, and Panama, as well as with Colombia, Venezuela, Trinidad, and the larger and smaller Antilles are very intimate and frequent. In this area, among other important institutions, are located the Finlay Institute of Havana, the Gorgas Institute of Panama, the School of Hygiene and Public Health of Mexico City, the School of Tropical Medicine, San Juan, Puerto Rico, and Tulane and Louisiana State Universities of Louisiana.

According to Dr. Hurtado, the proposed Institute would serve to link up this chain of institutions and promote their coöperative study of the special problems of this area. Dr. Hurtado proposes that the Pan American Sanitary Bureau should be urged to organize such a central link in coöperation with the American Public Health Association.

Dr. Hurtado proposes that a Round Table be assembled made up of the officials of the Pan American Sanitary Bureau, representatives of the U. S. Public Health Service, the U. S. Army, the U. S. Navy, the American Public Health Association, and delegates from the states and nations mentioned above. Dr. Hurtado would "cultivate the policy of continentalism as the best form for guaranteeing the happiness and well-being of our own countries." He would not create another special organization but rather would stimulate the practical organization of such an institute "to obtain stronger connections and more profitable interchange among the countries, states, and regions which are located within the

natural circle and linked for a variety of reasons." Dr. Hurtado made special reference to the desirability of steps like these which would prevent the international exchange of infections like yellow fever, virulent malaria, typhus fever, poliomyelitis, encephalitis, and other tropical and subtropical conditions.

PERSONALS

Central States

FRED T. ANDREWS, M.D., has resigned as Director of the Health Department of Bay County, Michigan, to become associated with the Fisher Body Division of the General Motors Corporation in Lansing.

N. BERNETA BLOCK, M.D., of Lansing, Mich., with the State Department of Health since 1937, has been named Director of the Alger-Schoolcraft Health Department with headquarters in Manistique. Dr. Block succeeds JEAN B. RUHL-KOUPAL, M.D., who has been named Director of Health District No. One including Crawford, Kalkaska, Missaukee, and Roscommon Counties.

RAYMOND V. BROKAW, M.D.,* Chief of the Division of Cancer Control in the Illinois Department of Public Health, Springfield, has been made Acting Director of the Champaign-Urbana Local Public Health District, succeeding R. F. REIDER, M.D., DR.P.H.† Under this plan the state will share with a local health district the services of a division chief in order most fully to utilize the available trained public health personnel in civilian life. Dr. Brokaw formerly was Executive Secretary of the American Society for the Control of Cancer.

* Fellow A.P.H.A.

† Member A.P.H.A.

HUGH A. COWING, M.D., was elected President of the Muncie, Ind., Board of Health on January 15.

ALBERT C. EDWARDS, M.D.,† of White Cloud, Mich., Director of the Fifth District Health Department, has resigned to become head of the St. Clair County Health Department.

MORELAND EMERSON, D.D.S., M.P.H., has been appointed Chief of the Dental Health Education Division in the Illinois Department of Public Health, Springfield. He is a graduate of the Washington University School of Dentistry and of the University of Michigan School of Public Health. He succeeds C. F. DEATHERAGE, D.D.S.,† who has resigned to enter private practice.

JAMES CARL FREED, M.D., of Attica, Ind., has been named Health Officer for Attica.

W. R. GIEDT, M.D., M.P.H.,† has been appointed Acting State Superintendent of Health of South Dakota, with headquarters in Pierre, succeeding JOHN FRANKLIN D. COOK, M.D., deceased.

DONALD M. HARRIS, M.D.,* of LeMars, Iowa, Medical Director of District Health Service No. 3, with headquarters in Spencer, was named to succeed CHESTER L. PUTNAM, M.D., M.P.H.,† in the Eighth District.

EARLE C. MCBRIDE, M.D., of Terre Haute, Ind., was elected President of the City Board of Health.

JAMES E. McMEEL, M.D., of South Bend, Ind., was elected President of the South Bend Board of Health recently, succeeding GEORGE F. GREEN, M.D., who has gone into military service.

ALICE H. MILLER, C.P.H.,† recently resigned as Director of Health Education for the Tuberculosis Institute of Chicago and Cook County, to become Health Education Consultant with the U. S. Public Health Service, at Kinston, Lenoir County, N. C.

WILBURN O. B. NELSON, M.D., has been named Health Officer of Fergus Falls, Minn., to succeed the late WILLIAM A. LEE, M.D.

CARL N. NEUPERT, M.D.,† of Madison, Wis., has been appointed State Health Officer of Wisconsin, to succeed CORNELIUS A. HARPER, M.D.,* of Madison, who resigned as State Health Officer and as member of the State Board of Health. GUNNAR GUNDERSEN, M.D., of LaCrosse, succeeds Dr. Harper as member of the Board.

JOHN J. REHORST, M.D., has been appointed Health Officer of Fond du Lac, Wis., on a part-time basis until a permanent full-time appointment can be made, filling the vacancy that occurred when ROBERT L. DANA, M.D., obtained a leave of absence to enter military service.

ERWIN C. SAGE, M.D., M.P.H.,* who has been health officer in Des Moines County, Iowa, has resigned and has been commissioned Lieutenant Commander, M.C., U.S.N.R., and is at present stationed at the U. S. Naval Training Station, Bainbridge, Md.

REGNAR M. SORESENSEN, M.D., C.P.H.,* Surgeon, U. S. Public Health Service Reserve, formerly of Des Moines, Iowa, has been detailed by the Service as Director of the Division of Venereal Diseases of the Kansas State Board of Health. He succeeds ROBERT H. RIEDEL, M.D.,† of Topeka, Kans., who has been given a leave to serve as Captain in the Medical Corps of the U. S. Army.

GEORGE C. STUCKY, M.D.,† of Charlotte, Mich., Health Officer of Eaton County, was recently placed in charge of the Barry County Unit. The two units were combined for the duration.

* Fellow A.P.H.A.

† Member A.P.H.A.

DR. A. L. TATUM, Professor of Pharmacology at the Medical School of the University of Wisconsin, Madison, Wis., has been awarded the Charles Mickle Fellowship at the University of Toronto, for his work in the introduction of mapharsen for the treatment of syphilis and for other studies in pharmacology. The Fellowship is in the nature of an award, being the annual income from an endowment of \$25,000.

Eastern States

FRANK A. CALDERONE, M.D., M.P.H.,* Secretary of the New York City Department of Health, has been appointed Deputy Health Commissioner, to succeed GEORGE T. PALMER, DR.P.H., resigned.

DR. VINCENT DU VIGNEAUD, head of the Department of Biochemistry at Cornell University Medical College, New York, N. Y., recently addressed the Central Pennsylvania Section of the American Chemical Society on "Trans-Methylation as a Metabolic Process." According to *Science*, it was emphasized that trans-methylation is the first new principle introduced into the science of nutrition since the discovery of the vitamins.

CARL H. FLINK has been appointed Technical Secretary of the American Society of Heating and Ventilating Engineers, New York, N. Y.

MARY ESTELLE INGOLDSBY, R.N., of New York, N. Y., has been appointed Industrial Nurse Consultant with the Bureau of Industrial Hygiene, West Virginia State Department of Health, Charleston.

ELNA I. PERKINS,† of Boston, Mass., Treasurer of the Massachusetts Public Health Association, joined the Division of Industrial Hygiene of the U. S. Public Health Service as Associate Health Education Specialist, as of April 1.

DAVID D. RUTSTEIN, M.D.,* has been

appointed as Medical Deputy Commissioner of Health of the New York City Department of Health. He will be in charge of the city's gas defense preparations as well as the nutrition and industrial hygiene programs of the department. Dr. Rutstein is a graduate in medicine from Harvard, has served with the New York State Department of Health as Medical Consultant in the Bureau of Pneumonia Control and as Chief of the Cardiac Bureau, and recently has been consultant in the medical aspects of chemical warfare, U. S. Public Health Service.

EDGAR J. STAFF, SN.C.,† formerly with the Rhode Island Department of Health, is a Major in the Sanitary Corps of the U. S. Army, now attached to the 1st Service Command, with offices in the Army's central laboratory for New England which is located at the old Harvard Bussey Institute, Jamaica Plain, Mass.

WILLIAM J. TIFFANY, M.D., of Albany, N. Y., has resigned as Commissioner of Mental Hygiene of the State of New York, effective April 1.

Southern States

CHARLES E. BALLARD, M.D., of Alledale, S. C., has been appointed Director of the Pickens-Oconee Health Unit.

ANTHONY J. BOROWSKI, DR.P.H.,† has resigned his position with the Federal Works Agency and has accepted a position as statistician with the Division of Records & Statistics, Department of Public Health, Richmond, Va.

HARRY M. BROWN, M.D., physician at the duPont plant at Belle, W. Va., has been added to the staff of the West Virginia State Health Department as part-time consultant in the

* Fellow A.P.H.A.

† Member A.P.H.A.

Bureau of Industrial Hygiene, filling the vacancy created by the resignation of J. W. CROSSON, M.D.

SAMUEL P. BURT, M.D., of Louisburg, N. C., has been named Health Officer of Franklin County to succeed RICHARD F. YARBOROUGH, M.D., of Louisburg.

HAZEL C. CAMERON, formerly of the teaching staff of the West Virginia University at Morgantown, has been appointed Nutritionist in the Division of Maternal and Child Health, West Virginia State Department of Health, Charleston, filling the vacancy caused by the resignation of Mrs. MABEL PERRY POLAN, who is now State Nutritionist with the Texas State Department of Health, Austin.

CHARLES M. COVINGTON, M.D., of Alto, Tex., was recently appointed Epidemiologist of the Travis-Bastrop County Health Unit, to succeed HUGH SHANE, M.D., of Austin, who entered military service.

HUGH S. CUMMING, M.D.,* formerly Surgeon General of the U. S. Public Health Service, Washington, D. C., and for many years director of the Pan American Sanitary Bureau, has received an honorary degree conferred by the University of Santo Domingo recently.

LELAND H. EVANS, D.D.S.,† Passed Assistant Dental Surgeon (R), U. S. Public Health Service, Bethesda, Md., has been assigned to the Division of Industrial Hygiene, Michigan State Department of Health, Lansing, as consultant on industrial dentistry.

WILLIAM O. FUNDERBURK, M.D., of Elkhart, Tex., was recently named Health Officer of Anderson County, succeeding FRED E. FELDER, M.D., of Palestine. Dr. Funderburk formerly served as County Judge.

GEORGE G. HOWARD, Passed Assistant Surgeon, U. S. Public Health Service Reserve, has been placed in

charge of the Parker and Palo Pinto County [Texas] Health Unit.

EVERETT A. KING, M.D. of Hardinsburg, Ky., Director of the Tricounty Health Unit of Breckenridge, Hancock, and Meade Counties, Ky., has been named full-time Health Director for Evansville and Vanderburgh County, Indiana.

RALPH CHRISTOPHER LEGGO, Surgeon, U. S. Public Health Service Reserve, has been placed in charge of the Industrial Hygiene Service of the State Department of Health of Ohio. Dr. Leggo was recently Industrial Hygiene Physician for the Missouri State Board of Health at Jefferson City, Mo.

F. A. MUSACCHIO, M.D., M.S.P.H.,† formerly of Franklin, La., has been appointed Director of the St. Joseph County Health Department, Centreville, Mich.

WILLIAM B. NELSON, M.D.,† of Bay Minette, Ala., Health Officer of Baldwin County, has been placed in charge of the health units at both Baldwin and Escambia Counties.

ALBERT M. PRICE, M.D.,† of the staff of the West Virginia State Department of Health, Charleston, has been given leave of absence until July 1 to serve as Acting Director of the Kanawha County Health Department with headquarters in Charleston.

COLONEL JAMES STEVENS SIMMONS, M.C., Director of the Division of Preventive Medicine, Office of the Surgeon General, U. S. Army, was appointed a Brigadier General in the Army of the United States by the President on April 2, 1943, with rank from March 14, 1943.

LEWIS HILL WEED, M.D., Professor of Anatomy at the Johns Hopkins University School of Medicine, Baltimore, Md., has been appointed

* Fellow A.P.H.A.

† Member A.P.H.A.

Chairman of the Medical and Health Advisory Committee of the American Red Cross, Washington.

OLIVE WHITLOCK, R.N.,* Associate Public Health Nursing Consultant to the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., has resigned following her recent marriage but will serve as Special Consultant to the U. S. Public Health Service on Industrial Hygiene Nursing. Miss Whitlock was formerly chief nurse in the Oregon State Department of Health. During the two years she has been associated with the Division of Industrial Hygiene the number of Industrial Hygiene Nursing Consultants has increased from 3 to 18. *Industrial Hygiene* reports that "special credit is also due Miss Whitlock for her leadership as chairman of the American Public Health Association committee which conducted the nation-wide survey to study the duties of nurses in industry." This survey will shortly be published in the *American Journal of Public Health*.

CHARLES L. WILLIAMS, JR., M.D.,† of New Bern, N. C., Assistant Surgeon, U. S. Public Health Service, has been appointed Health Officer of Lenoir County, to succeed ZEBULON V. MOSELEY, M.D.,† of Kinston.

Western States

WILLIAM J. O'CONNELL, JR.,† of San Francisco, Calif., has organized with L. L. CARTER, a firm called Technical Consultants which has for its particular interest consultation on the biological, chemical, and technical problems arising from the use of water.

ARTHUR L. RINGLE, M.D., of Portland, Ore., has been appointed District Health Officer with headquarters at Walla Walla, to succeed JOHN A. KAHL, M.D., M.P.H.†

WILLIS E. SMICK, M.D., of Seattle, Wash., has been named Health Officer of Cle Elum.

GEORGE B. WRIGHT, M.D., of Kalispell, Mont., has been named Health Officer of Flathead County, to succeed ALBERT A. DODGE, M.D., of Kalispell.

Paraguay

DR. FRANCISCO A. MONTALDO has been appointed Director of the recently created Department of Nutrition in the Ministry of Public Health of the Republic of Paraguay. Dr. Montaldo specialized in the study of nutrition for two years at the Institute of Nutrition at Buenos Aires on a scholarship provided by the government.

DEATHS

JOHN FRANKLIN D. COOK, M.D., State Superintendent of Health, Pierre, S. D., died January 17.

A. GRANT FLEMING, M.C., M.D., D.P.H., F.R.C.P.,* of Toronto, formerly Dean of the Medical School at McGill University, Montreal, and Professor of Public Health and Preventive Medicine at McGill, died April 9. Dr. Fleming was elected a member of the American Public Health Association in 1920 and a Fellow in 1930. He was A.P.H.A. Vice-President in 1939 and an elective member of the Governing Council 1937-40 and 1940-43. He was a member of the Committee on Administrative Practice 1936-44. At the time of his death Dr. Fleming was President-elect of the Canadian Public Health Association and had been slated to head the new Preventive Medicine Unit caring for the general health of Canada's army.

EMMA A. WINSLOW, PH.D.,* of West View Park, Riverside, Conn., for-

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Medical Care for Dependents of Men in Military Service*

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GUARDING the health of the families of men in the armed forces becomes a very real problem as our nation swings into the full war effort. When men by the millions are moved about the face of the globe, many problems are left behind. One of these is securing adequate medical care for dependents at home. Maternity care becomes a vital concern of the men in service as well as of their wives from whom they are so often separated. The economic adjustments made necessary in wartime in hundreds of thousands of homes raise the question as to whether good care will be available to the expectant mother.

Realizing these facts, far-sighted advisory groups have for several years assisted in making plans for just such an eventuality as now confronts us. To provide care for women during child-bearing and to assist in taking care of their sick infants, the Children's Bureau in the spring of 1942 set aside certain

funds. These were specifically designated to be used to insure adequate medical and, when necessary, hospital care in soldiers' families when such attention was not otherwise available. The responsibility for administering this program was delegated to the various state health agencies already conducting maternal and child health programs. Less than \$200,000 was available when the Children's Bureau brought the matter to the attention of the several states. By October, 1942, requests for funds had been submitted from 26 states. These were approved and represented funds totalling \$308,000 to meet the immediate needs.

At first there could be no definite idea as to the probable extent of the need. Experience to date suggests that there will be a steady increase in the demand for these services. This will probably continue for the duration of the war and for a short period thereafter. Surveys had indicated that in an American army of five million men, 20 per cent would be married and that 5 per cent of all babies born in the year beginning July 1, 1942, would

* Based on paper presented before the Maternal and Child Health Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 30, 1942.

have fathers in the armed services. It is thought that in another year the figure would be nearer to 10 per cent. At present more than 400 babies are being born each day of soldier-fathers. As had been predicted, the wives of soldiers began to seek assistance for maternity care through various agencies by the spring and summer of 1942. The Red Cross surveys indicate that probably more than 25,000 wives of servicemen are seeking obstetric and pediatric care each month.

By December 1, 1942, requests from the health agencies of 39 states for funds to care for servicemen's dependents totalled over \$2,250,000. This was the estimated amount necessary to complete the program during the current fiscal year.

A deficiency act has now been approved by Congress and signed by the President carrying \$1,200,000 to meet the emergency. This action of the Congress is for an emergency period which is defined as the duration of the present war and 6 months thereafter. An appropriation of at least \$6,000,000 will be sought annually to provide for the continuation of these special types of care in the families of certain groups of men in military service.

New Mexico had a plan approved early in July, 1942, and the first applications were received August 1 of that year. Any new program in public health is always interesting. Like the ever popular jig-saw puzzle, the many parts of this new plan were well scattered and had to be brought together. There was no assurance as to just what the final picture would be. There are at least three fixed factors to serve as guides: the amount of money available, the time limits placed upon its expenditure, and the estimated need for the service. The first two of these are very definite, the last is still a matter of guess work.

Other parts of the puzzle that have

to be considered are the personnel to be used, the hospitals available, the standards of care, the extent of the services, the machinery to make the plan operate effectively, suitable record forms, an accounting system, and, finally, the question of what to do with the hundreds of variants that arise once the program is under way.

From the start, the situation in New Mexico presented one problem after another which had to be adjusted. The approved plan represented a sincere attempt to provide the care in the manner intended. Before the program had been in operation three months, numerous alterations were necessary. Changes had to be made in order that the underlying principles desired by the sponsors could be carried out. Unexpected difficulties in the actual operation of the plan are still being encountered.

Since the application of the national program to New Mexico is being described in this paper, it is necessary that a brief picture of the state be presented. New Mexico is famous for its scenery and climate. Chambers of Commerce make much of this, and rightly so, but New Mexico is also a land of social problems which are very different from those of Ohio, Alabama, or Maine. Just a few of the factors which influence the approach to any health problem may well be mentioned. With a population of only 550,000 scattered over the fourth largest of these United States, it is easily seen that problems of communication are real and social handicaps numerous. In addition, there is the racial and language difficulty. In some counties the Spanish speaking portion of the population is above 90 per cent. The fact that a vast majority of families are living at a low income level, further complicates attempts to render health and welfare services.

Many of these factors account, in part at least, for the unenviable health

reputation which the state has earned. Infant mortality, here as elsewhere, is a good index in estimating health conditions. From 1930, when the rate for the state was 145, there has been a drop to 93.7 in 1941. Maternal mortality rates are well above the average for the whole country.

These facts are presented to show that there is a constant need in New Mexico to supervise and assist those who, for economic reasons, will not secure adequate medical care unless such assistance is literally placed in their way. This is true in many of the soldier homes in New Mexico.

New Mexico is not humming with defense or war activity as are many other states. A total of fifteen areas busily engaged in war activity are found in the state, these being principally air bases and mining areas. The soldier population is relatively small compared with other sections of the country, but it is large in proportion to the number of civilians, and this soldier population is steadily increasing. We already have, scattered throughout the vast area of our state, the families of more than 2,000 New Mexico soldiers who were at Bataan or on Corregidor.

The families of men in the service can be divided into two groups: the old-time residents who have stayed in remote and often isolated regions, and another group which is made up of new residents who have come to New Mexico to live near their men in the camps and have stayed in the larger population centers when their men have been sent away for foreign duty. Both of these groups need assistance from the plan under discussion. Each group presents a somewhat different problem.

WHAT THE PLAN OFFERS

The plan for the care of wives and children of men in the armed services, as it is operating in New Mexico, is,

very briefly, as follows: Maternity service including prenatal, delivery, and postpartum care is provided in either a hospital or the patient's home. The care given is by a doctor of medicine of the patient's choice. This service also includes the care of the new-born infant. At least five prenatal visits are required, and the service terminates only when mother and baby have been examined 6 weeks after the delivery. When complications or abnormalities arise in the course of maternity care, consultation is available and any reasonable amount of indicated special care can be authorized. Care of infants under 1 year of age, for any illness, is also provided, and can be secured from an approved doctor of medicine in his office, the patient's home, or at an acceptable hospital.

In both types of service the choice by the family of an attending physician is assured with very few restrictions. It is impossible in New Mexico to use specialists in other than a few locations. However, if in some parts of the state, physicians with somewhat inferior training have to be used, such service is definitely preferable to maternity care by a midwife or untrained person. A recent poll of the physicians in New Mexico showed a ratio of 1 doctor (M.D.) who can be used in the program under consideration to approximately 3,000 of the population.

Among the expectant mothers in the families long resident in New Mexico, care by midwives at the time of confinement is all too prevalent and years of teaching are only now being rewarded by an increase in the percentage of cases delivered by physicians.

Those women who have come into the state recently, and who are eligible for service under the plan to care for soldiers' wives, have probably come from sections of the country where they could obtain good obstetrical care. If they reside near army camps close to

the cities or small towns in New Mexico, they will find facilities for a very satisfactory type of professional service and hospital care.

MAKING APPLICATION

Any woman desiring service for herself or her sick infant may make application. A form is signed by the mother stating that her husband or the father of the sick infant is in the service of the United States. The service at first was offered to the families of men in all branches of the military forces below the rank of a commissioned officer, regardless of the financial status of the family. Funds now available by the recent action of Congress place a limitation upon the expenditure in that it applies only to the four lower grades in the various armed services. Applicants who qualify otherwise are refused only when it can be established that satisfactory service is available to them from other sources.

When a physician has been selected by the applicant, the forms are completed and signed by the applicant and the physician, both of whom agree to abide by the conditions of the State Department of Public Health plan. If all conditions are met, the service is authorized by the Director of Maternal and Child Health.

FEES PAID

Approved physicians and hospitals agree to accept the care of the case at the fee stipulated by the state agency and to make no further charge against the patient or her family. The fee for complete maternity care is \$35. Allowance is made for any unusual condition that may arise.

When hospital care is indicated, the hospital chosen by mutual consent of the patient and attending physician must be one that is acceptable to the State Department of Public Health. An agreement to provide satisfactory

care at stipulated rates is made with each hospital before approval is granted to participate in the plan.

The rate paid to hospitals for obstetrical care is \$40 for 10 days' complete care at ward level. Allowances are made for "extras" in connection with abnormal deliveries. The payment for these additional items is made by agreement as the situation arises. Care of sick infants is paid for at an agreed rate per day which differs somewhat in various hospitals, the average being \$2.50 a day.

There is no reason to be proud of the type of hospital which it is necessary for patients to use in some parts of our state. On the other hand, a number of very satisfactory small hospitals, equipped for ordinary emergencies, are serving residents in isolated areas of the state. Recently a patient had to be brought to the nearest hospital, a distance of a hundred miles, a week in advance of the expected date of confinement. One good rain could have made the only road impassable for several days. At the hospital in question, excellent care was provided by a competent obstetrician.

The question has been raised as to the possible preference for home delivery in some cases in view of the fact that delivery at home might prove as safe as in the hospital. In answer, it can be said that use of a hospital is made practically mandatory in view of the fact that many physicians refuse to deliver any patients outside of the hospital. The plan permits payment for home delivery where physician and patient request it.

When service has been authorized, notice is sent to the attending physician, the hospital, the mother, the local health unit, as well as any referring agency.

FOLLOW-UP SERVICES

All of these notifications are made

for obvious reasons, but it might be pointed out that the contact with the public health unit is to give the nurses an opportunity to become acquainted with the patients as early in pregnancy as possible. A great deal of assistance can be offered in some cases. Patient's with an anxiety complex can be assured of the friendly services these nurses offer.

The nurses help in adjusting problems of many kinds: interpreting physicians' orders, checking attendance at prenatal examinations, adjustment of possible household problems involving outside help or housekeeper service, guidance where financial problems have become acute, preparation of layettes, arrangements for hospitalization, and, probably most important of all, making the home visits which help to guard against preventable complications.

After the patient's return from the hospital, the nurse's visits are much more effective if the contact with the patient has been a prenatal one. Her invitation to have the mother take advantage of well child clinics will probably result in helping to keep the new-born baby well.

At the termination of a case, or when the postpartum examination of mother and infant has taken place, the maternity record form is completed by the physician and returned to the State Health Agency. Payment for service is made to the doctor and the hospital by check from the State Department of Public Health.

The care of a sick infant is initiated in the same manner as for maternity service. A patient suffering from any condition is accepted for care, and consultation provided if possible when needed. When the patient is discharged, a brief clinical summary must accompany the physician's bill for services.

Any individual or agency who learns of an expectant mother or her sick in-

fant can aid in initiating an application for assistance.

OTHER PROBLEMS

A few of the problems which still confront those responsible for the operation of this plan might well be mentioned.

Refusal to stay in the hospital for 10 days has been found to be due to indifference of the physician, the desire of hospital authorities to speed the turnover where institutions are crowded, or to anxiety over household problems such as the care of small children at home. The first two can be guarded against by kindly suggestion and perseverance. To help the last difficulty, arrangements can sometimes be made in advance to provide adequate help. This will solve the problem for some homes. Rural homes suffer less from this particular difficulty. Care in a good hospital is urged in the hope that it will stimulate interest in getting the best possible obstetric care.

Another problem arises from the reluctance of physicians to submit adequate records which are the principle means of judging standards of care.

A further difficulty is that some hospital superintendents feel that they are entitled to as large fees as they can possibly get. It is true that the costs in small institutions are such that the fees paid under this plan represent little opportunity for profit. Under the Children's Bureau plan for payment of properly estimated per diem costs to be initiated in the next fiscal year, this difficulty will no longer exist.

It might be noted that physicians have taken a very liberal attitude toward their fees and few complaints have been registered. Assured payment for service from a group which, as individuals, are frequently guilty of non-payment of doctors' bills, the physician has every reason readily to accept care of these cases.

COMPLETED AND PENDING SERVICES

By January 1, 1943, all funds allocated to New Mexico (\$19,000) had been earmarked to provide for 335 applicants whose care had been authorized.

All physicians in the state were then notified that there would have to be a lapse in the service until additional funds were secured. There was a prompt falling off in the rate of filing applications, due in part to the unwillingness of physicians and hospitals to accept cases without assurance of payment. Despite this fact, during January and February 225 new applications were received and most of these have now been approved.

Maternity care has been given by 45 different doctors at an average cost of \$76 per case for medical and hospital care. All cases were hospitalized except 2. The average hospital cost was \$42 per case.

The program has meant a great deal to both those receiving the care and also to their families. This is attested by opinions expressed to workers in Red Cross home service, health and welfare department workers, and many

others who have been in touch with the situation. Pathetic letters expressing the great need of many of the young mothers have accompanied the requests for the service and many have expressed the satisfaction experienced from having had the opportunity to secure good care when such a prospect often seemed remote.

Beside the actual benefits of medical and hospital care for the mother and her babies, the educational value of the program has been apparent. A realization of what constitutes good obstetric care has come to many homes and rural areas of the state which have never known anything but the care by midwives in crowded adobe homes without basic conveniences.

The people of New Mexico have enjoyed real benefit from this program. It is a venture into a new field of health activity that has been well received. Additional social security is made possible by this plan for the families of our fighting men at a time when this adequate care means much to morale on both the battle front and the home front.

Statistical Aspects of Coding and Tabulating Medical Data on Birth and Stillbirth Certificates*

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THE war, which is now affecting directly or indirectly the entire human race, has made the protection of the life and health of the coming generation a more vital obligation than ever before. The popular adage coupling childbearing with child-burying epitomizes the experience and fatalistic attitude of centuries. Even in 1906 infant mortality, in the words of Sir George Newman,¹ was a problem because it was not decreasing, while the general death rate was moving downward. Almost coincident with the time of this observation the development and application of what have since become elementary measures, such as the pasteurization of milk, the protection of water supplies, and immunization against diphtheria, demonstrated the preventability of a great many of the deaths in infancy. For example, thirty years ago for every 1,000 children born alive in New York State, 101 died before reaching their first birthday; in 1941 the rate of mortality was but 33.

One need go back only a few years to find an attitude of almost com-

placent resignation toward the shamefully high maternal mortality; it was not until representative organizations of the medical profession instituted searching inquiries into the causes and circumstances of such deaths, and discovered and publicized the shortcomings in obstetrical practice that this mortality commenced to decline. In New York State the success of such efforts, combined later with the new chemotherapy, became evident in 1934, when the maternal mortality dropped to 51 deaths for every 10,000 live births and stillbirths, as compared with an average rate of 60 for 1931-1933, and 61 in 1933. In the following years the downward movement continued at an accelerated pace, and in 1941 the rate was only 22, a reduction of 64 per cent in 8 years.

Even with the present low rates, however, the loss of life of mothers and infants from diseases and conditions associated with childbirth is still unnecessarily high. To make further progress possible, expert opinion² stressed the need for certain basic medical information that was not available with respect to all births. This information could be continuously and currently secured only by means of birth and stillbirth certificates. Therefore, the content of the medical part of

* Presented at a Joint Session of the Maternal and Child Health and Vital Statistics Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

FIGURE 1

New York State Department of Health
DIVISION OF VITAL STATISTICS

CERTIFICATE OF STILLBIRTH

Dist. No. 2701 B5389
Registered No. D3047
To be inserted by registrar 2128

| | | | |
|--|--|--|--|
| 1 PLACE OF STILLBIRTH: STATE OF NEW YORK County <u>Monroe</u> Town _____ Village _____ City <u>Rochester</u> <u>18</u> Ward No. <u>Highland Hospital</u> St. _____ (If a hospital or institution give its NAME instead of street and number) Length of mother's stay before delivery: In hospital or institution _____ yrs. _____ mos. <u>4</u> days In town, village or city _____ yrs. _____ mos. _____ days | | 2 USUAL RESIDENCE OF MOTHER: (If an institution, give place of residence prior to admission) State <u>New York</u> County <u>Monroe</u> Town _____ Village _____ City <u>Rochester</u> No. _____ St. _____ Is residence within limits of city or incorporated village? _____ | |
| 3 Full Name of Child _____ | | 4 Date of Stillbirth (Month) _____ (Day) _____ (Year) <u>19</u> | |
| 5 Sex <u>If plural</u> { <u>4</u> <u>Twins, triplet or other</u> } <u>5</u> <u>Children born to this mother:</u> Number, in order of birth _____ (a) <u>How many children of this mother are now living?</u> _____ (c) <u>How many OTHER children were born dead?</u> _____ | | 6 Full maiden name <u>MOTHER</u> _____ | |
| 7 Full name <u>FATHER</u> _____ | | 8 Full maiden name <u>MOTHER</u> _____ | |
| 9 Color or race _____ 10 Age at last birthday _____ (Years) _____ | | 11 Color or race _____ 12 Age at last birthday _____ (Years) _____ | |
| 11 Birthplace (city or town) _____ (State or country) _____ | | 13 Birthplace (city or town) _____ (State or country) _____ | |
| 12 Usual occupation <u>tool maker</u> | | 14 Usual occupation <u>Housewife</u> | |
| 13 Industry or business <u>machine tool</u> | | 15 Industry or business <u>Home</u> | |
| 16 Was the blood of this child's mother tested for syphilis: (a) During pregnancy? Yes <input checked="" type="checkbox"/> No _____ Date <u>May, 1941</u> (b) At delivery? Yes _____ No _____ (c) If no test was made, state reason therefor _____ | | | |
| 17 I hereby certify that I attended the birth of this child, who was born dead at <u>12.06</u> <u>A.M.</u> , on the date above stated. (Signed) _____ <u>M.D.</u> 22 Address <u>Highland Hospital</u> (Physician, midwife, father, etc.) | | | |
| MEDICAL CERTIFICATE OF ATTENDING PHYSICIAN, HEALTH OFFICER OR CORONER | | | |
| 23 Pregnancy complicated by: <u>Prematurity</u> | | 24 Cause of stillbirth (state only morbid conditions causing fetal death. Do not use such terms as prematurity, asphyxia, etc.): (a) Fetal causes <u>Cord about neck 2 X</u> (b) Maternal causes <u>Face presentation</u> | |
| 24 (a) Labor complicated by: <u>Prematurity</u> (b) Labor <u>was not</u> induced (was or was not) _____ | | 25 I hereby certify that I investigated the birth of this child, who was born dead on the date above stated and that said death occurred before labor. | |
| 25 (a) There <u>was</u> <u>an operation for delivery.</u> (was or was not) _____ (b) Nature of operations, if any, <u>forceps and episiotomy</u> (c) Child died before operation <input checked="" type="checkbox"/> during operation _____ | | 26 Signed _____ (Physician, Health Officer, Coroner) Address <u>Highland Hospital</u> | |
| 26 Period of uterogestation <u>8 + months</u> (Months) _____ | | 27 DATE OF BURIAL (Month) <u>11</u> (Day) <u>8</u> (Year) <u>41</u> | |
| 28 PLACE OF BURIAL OR REMOVAL <u>Highland Hospital</u> | | 29 ADDRESS OF UNDERTAKER <u>Highland Hospital</u> | |
| 30 SIGNATURE OF UNDERTAKER OR PERSON IN CHARGE _____ | | 31 FILED <u>11/7</u> <u>1941</u> 32 <u>Henry Liehman</u> REGISTRAR | |
| 34 BURIAL PERMIT ISSUED BY <u>Henry Liehman</u> | | 35 DATE OF ISSUE <u>11/7-41</u> | |

the standard certificate of stillbirth was elaborated, and a set of optional questions added to the standard form of birth certificate. The stillbirth certificate and the optional questions on the birth certificate, as employed by the New York State Department of Health * beginning January, 1940, are shown in Figures 1 and 2.

COMPLETENESS AND ACCURACY OF

MEDICAL INFORMATION

Since the medical questions are an

integral part of the stillbirth certificate, they are practically always answered. The questions on the certificate of live birth do not constitute a legal part of the certificate, and the physicians are under no compulsion to answer them. It is, therefore, particularly gratifying that answers to the latter questions appear on somewhat more than 90 per cent of the birth certificates; the supplementary questions are wholly disregarded on 7 per cent; weight alone is given on approximately 2 per cent. The incomplete certificates are concentrated in comparatively few counties—in 1941 more than half of

* In New York City a special detailed report form has been in use since 1938.

the incomplete certificates were filed in only 6 of the 57 counties.

Since the purpose of the questions on the certificates is not only to ascertain the incidence of complications and of the methods of delivery but also to measure the neonatal, stillbirth, and maternal mortality associated with these factors, every certificate of an infant or maternal death is matched with the corresponding birth certificate. In our procedure this is accomplished in the following manner: For every infant death the date and place of birth are added to the punched death card (which is a combined statistical and index card). Once a month all of these cards are duplicated, foundlings and births out of state are excluded, the remaining cards are sorted by month of birth and soundexed name, and then used as index cards with which to search the monthly birth indexes. If the matching birth certificate is not found, an inquiry is sent to the

registrar of the community where the birth occurred. Certificates of puerperal deaths, except those stated to be associated with an undelivered pregnancy or an abortion of less than 5 months' gestation (the reporting of which is not required by the New York State Public Health Law), are used in similar manner in a search of both live birth and stillbirth indexes. If the matching birth certificate cannot be found, a form letter is sent to the physician who signed the death certificate asking for the period of gestation and the date and place of birth. At the end of the year a card is punched for every infant or maternal death combining, on the same card, the pertinent data from the matched birth and death certificates.

The comparison of the birth and stillbirth certificates with the death certificates indicates that in an indeterminate number of cases the replies to the additional questions are not suf-

FIGURE 2

SUPPLEMENTAL REPORT BY PHYSICIAN

NOT TO BE COPIED INTO LOCAL REGISTER

The answers to the following questions, which the New York State Department of Health is asking the physician in attendance at this birth to supply, will form the basis for more intensive work toward further progress in the protection of the lives of infants and mothers.

All of the facts entered by the physician on this side of the certificate will be considered confidential and will be used only for statistical purposes. None of them will, under any circumstances, appear in the certifications or transcripts issued by the Department.

| | |
|--|--|
| Pregnancy, complications of: NONE | Were any operative or instrumental procedures used? YES |
| | Specify: MID. FORCEPS |
| | Indications: CONTRACTED PELVIS |
| Labor, complications of: NONE | Did baby have any |
| | (1) Congenital malformation? NO Describe |
| | (2) Birth injury? NO Describe |
| Weight of baby at birth: 7 grams or 5 lbs. 5 ozs. | |

INSTRUCTIONS

In order to comply with the law this must be

Registrars are instructed to be written throughout "legible" erasure, interlineation, correction.

Note: If a mistake is made in the certificate before the certificate is accepted for registration, another blank may be filled in correctly and substituted for the erroneous certificate; but no certificate of birth after its registration.

within five days of the date of birth.

physician's signature: (1) Is incompletely filled in; (2) Is not dated, grossly soiled or defaced, inaccurate; (4) Contains any

(7) A blank (Form VS No. 33) will be supplied by the Local Registrar

residence is outside the limits of the city or village. It is, therefore, important that the question "Is residence within the limits of city or incorporated village?" always be answered by "yes" or "no".

Statement of Occupation. Male some entry in this section for each parent. For a woman whose only occupation is that of home housework, write housework in answer to item 18 and own home in answer to item 19. For a person engaged in domestic service for wages, however, designate the occupation by the appropriate terms, as housekeeper—private family, cook—hotel, etc. For a person who has no occupation whatever write none.

In stating the occupation, avoid the use of such indefinite terms as "employee," "worker," "operative," "engineer," "mechanic," "clerk," etc. Find out the particular kind of work done and return that, as spinner, weaver, etc.

In stating the industry or business, avoid the use of such general terms as "store," "factory," "mill," etc. State the particular kind of store, factory, mill, etc., as grocery store, soap factory, cotton mill, etc.

Physicians are required to report of ophthalmia neonatorum (believe's sore eyes) to local health officer within 24 hours from the time when first seen.—SANITARY CODE, CHAP. II, REG. 1 AND 2. A midwife, nurse, or other person having charge must report immediately to health officer or physician inflamed, reddened eyes of infant within the age of 2 weeks.—PENAL LAW, §152.

ficiently descriptive and at times incorrect. A birth certificate may contain no reference to a complication of pregnancy or labor, but the corresponding maternal death certificate, filed on the same date and signed by the same physician, may bear a positive statement, such as toxemia, placenta previa, or heart disease. For example, in one case the cause of death was given as chronic cardiovascular disease, difficult delivery with breech presentation; the woman died 16 hours after delivery, but the birth certificate mentioned only abruptio placenta as complication of pregnancy or labor. Errors are also discovered through the check of the certificates against the reports of positive Wassermann tests filed with the Division of Syphilis Control. Here it is occasionally found that a birth certificate contains no mention of syphilis as a complication while the woman was, in fact, under treatment for syphilis. Again, a birth injury or congenital malformation may be entered as the cause of an infant's death, while the corresponding birth certificate contains no mention of birth injury or malformation. In analyzing or interpreting the tabulated data it is, therefore, important to bear in mind that the different complications are in varying degree *understated*.

CODING OF COMPLICATIONS OF PREGNANCY AND LABOR

From a survey of the manner in which the certificates are filled out, it soon became apparent that it would be impossible to make any attempt to separate complications of pregnancy from complications of labor and indications for operation. For instance, the birth certificate reproduced here (Figure 2) states "none" under both complications of pregnancy and complications of labor, and yet "contracted pelvis" is given as the indication for the mid forceps operation. The sample

stillbirth certificate (Figure 1) gives "prematurity" under complications of pregnancy and complications of labor, but "face presentation with cord twice about neck" is entered as cause of stillbirth. Another stated *no* complications of pregnancy, persistent occiput posterior, prolonged second stage, and secondary dystocia as complications of labor, but gave preëclamptic toxemia as cause of stillbirth. There are many such cases. It was therefore decided to code and tabulate two complications whenever two sufficiently distinct complications were stated anywhere among the items. By sufficiently distinct, we mean that we do not code two forms, types, manifestations or symptoms of toxemia on the same case, or two of dystocia, but we do code both toxemia and dystocia, or toxemia and placenta previa, or dystocia and diabetes, etc. In the comparatively rare cases where more than two distinct complications were stated, only two were coded during 1940 and 1941, attempting to retain the more serious conditions.

The preparation of the code, which had the patient and invaluable advice of Drs. Elizabeth Gardiner and Helen Owen of the Division of Maternity, Infancy, and Child Hygiene, commenced with the listing of *all* terms appearing on the certificates. The extensive compilation (there were found 32 different ways of stating deviations in the bony pelvis and 30 of uterine inertia) was first compressed into 60 items and thus used in 1940 and 1941. Following the initial tabulations of the 1940 data, the code was further condensed to 36 terms and it is these terms that appear in Table 1. This table summarizes the incidence of the various complications of pregnancy and labor among the live births and stillbirths occurring in the 18 month period from July 1, 1940, through December, 1941, and the neonatal and maternal deaths associated with them.

TABLE 1

Incidence of Complications of Pregnancy and/or Labor
New York State, Exclusive of New York City, July, 1940–December, 1941

| | | <i>Live Births</i> | <i>Still-births</i> | <i>Deaths under 1 Month</i> | <i>Maternal Deaths</i> |
|--|--|--------------------|---------------------|-----------------------------|------------------------|
| Total | | 143,218 | 3,602 | 3,602 | 231 |
| Questions on complications answered | | 130,152 | 3,364 | 3,244 | 219 |
| No complications | | 95,455 | 723 | 1,603 | 35 |
| One or more complications | | 34,697 | 2,641 | 1,641 | 184 |
| Total complications | | 39,831 | 3,470 | 2,049 | 257 |
| Only one in this group coded | { Eclampsia | 196 | 68 | 32 | 18 |
| | { Other toxemia | 3,315 | 465 | 210 | 32 |
| | { Pyelitis, or other infection | 495 | 35 | 34 | 6 |
| | { Placenta previa | 737 | 155 | 158 | 13 |
| | { Premature separation of placenta | 525 | 503 | 134 | 18 |
| | { Bleeding during pregnancy, threatened abortion | 498 | 39 | 79 | 1 |
| | { Hemorrhage during labor, no mention of placental abnormality | 111 | 16 | 16 | 1 |
| | { Prolapsed cord, twisted, knotted or short cord | 646 | 623 | 86 | 8 |
| | { Breech presentation | 3,259 | 271 | 289 | 8 |
| Only one in this group coded, preferring in order listed | { Deviations of the bony pelvis | 2,583 | 150 | 78 | 26 |
| | { Malpresentations other than breech | 649 | 110 | 41 | 10 |
| | { Malformation or excessive size of fetus | 25 | 47 | 19 | 1 |
| | { Hydramnios | 192 | 130 | 79 | 2 |
| | { Uterine inertia | 3,609 | 75 | 70 | 9 |
| | { Other dystocia | | | | |
| | { Rigid perineum, perineal scars, etc.—questionable dystocia | 16,590 | 313 | 382 | 41 |
| | Previous Cesarean section | 530 | 5 | 26 | 6 |
| | Previous pelvic trauma | 121 | 1 | 9 | .. |
| | Precipitate delivery | 214 | 11 | 24 | 1 |
| | Lacerations | 1,528 | 2 | 14 | 1 |
| | Postpartum hemorrhage | 561 | 1 | 17 | 5 |
| | Rupture of uterus | 10 | 16 | 2 | 6 |
| | Surgical shock | 16 | 3 | 4 | 3 |
| | Diseases of the heart | 508 | 37 | 27 | 19 |
| | Syphilis | 187 | 36 | 13 | 1 |
| | Chronic nephritis | 99 | 40 | 10 | .. |
| | Other diseases of the genitourinary system | 130 | 9 | 8 | 1 |
| | Tuberculosis | 88 | 2 | 3 | 1 |
| | Pneumonia, influenza, bronchitis, acute respiratory | 180 | 30 | 24 | 3 |
| | Diabetes | 93 | 32 | 14 | 3 |
| | Anemia and other blood diseases | 210 | 18 | 13 | 2 |
| | Pelvic tumors | 147 | 30 | 15 | 2 |
| | Appendicitis | 80 | 4 | 11 | .. |
| | Diseases of the endocrine glands | 131 | 26 | 6 | 3 |
| | Mental and nervous diseases | 76 | 5 | 3 | 1 |
| | All other intercurrent diseases | 430 | 19 | 28 | 2 |
| | Accidents and over-exertion | 98 | 83 | 25 | 2 |
| Disregarded in 1942 | { Infarction of placenta, etc. | 19 | 24 | 3 | .. |
| | { Dry labor | 570 | 28 | 29 | .. |
| | { Edema | 107 | 8 | 4 | 1 |
| | { Varicosities | 268 | .. | 10 | .. |

The brackets and marginal notations indicate the major changes made in 1942 either by combination of terms or by further subdivision.

In condensing the original list of 60 complications to the present 36, a few terms were given up entirely: placental infarction, dry labor, edema, and varicosities; most of the condensation was made by combining related terms, such

as, all malpresentations other than breech, all lacerations, all previous pelvic trauma, all acute respiratory illness. The largest change of this kind was the combination of six separate terms into "other dystocia." * It was

* Persistent occiput posterior, Bandl's ring, anomalies of the soft parts, disproportion (without mention of abnormality of the bony pelvis), fetal distress, and dystocia without mention of underlying condition.

found that the statements on the certificates do not allow any significant, logical, or consistent distinction between these various forms of dystocia. Some of the conditions described in terms most commonly used on the certificate, such as transverse arrest, arrest of progress, and prolonged second stage, could be due either to persistent occiput posterior position, disproportion, non-dilation of cervix, etc. They might also, of course, be due to inertia, which is still kept as a separate title. The end result is that while the title "uterine inertia" is a fairly homogeneous group, some of the cases of inertia are in the miscellaneous group "other dystocia."

The tabulations have been made to show both an unduplicated count of cases with and without complications, and also, under *each* complication, all cases with that particular complication whether or not it was associated with some other. That is, any case with two distinct complications appears in the tabulation twice, once under each. In

general, it may be noted that there were two distinct complications in 15 per cent of the live births with complications, 31 per cent of the stillbirths, and 40 per cent of the maternal deaths.

Beginning with 1942, it was decided to allow for punching three complications for each case: two puerperal and one non-puerperal; and in addition, to provide for tabulating *all* distinct complications, however many there might be for any particular case. For all cases in which there are more than two puerperal or one non-puerperal complication, these as well as the other necessary data * are entered on index cards and, at the end of the year, added by hand to the machine tabulations.

CODING OF OPERATIVE PROCEDURE

All births have been classified into nine categories for operative procedure, as indicated in Table 2. Three of the

* Single or plural, full-term or premature, home or hospital, operative procedure, birth injury, age of mother, and number of previous live births and stillbirths.

TABLE 2

Incidence of Operative Procedures

New York State, Exclusive of New York City, July, 1940-December, 1941

| | <i>Live Births</i> | <i>Stillbirths</i> | <i>Deaths under 1 Month</i> | <i>Maternal Deaths</i> |
|--|--------------------|--------------------|-----------------------------|------------------------|
| Total | 143,218 | 3,602 | 3,602 | 231 |
| Question on operative delivery answered | 131,158 | 3,255 | 3,272 | 217 |
| No operation | 89,841 | 2,304 | 2,167 | 70 |
| Operated | 41,317 | 951 | 1,105 | 147 |
| Episiotomy alone | 5,705 | 45 | 72 | 3 |
| Low forceps | 24,526 | 231 | 356 | 40 |
| Forceps, plane unspecified } | | | | |
| Mid forceps } | | | | |
| High forceps } | 3,758 | 109 | 107 | 5 |
| Breech extraction | 1,493 | 87 | 127 | 5 |
| Version and extraction | 1,632 | 224 | 137 | 17 |
| Cesarean section | 3,445 | 158 | 226 | 65 |
| Other operations for delivery | 258 | 40 | 25 | 4 |
| Manual extraction of fetus | | | | |
| Bagging, not for induction | | | | |
| Mutilating operation | | | | |
| Other operative procedures | | | | |
| Operated, type not specified } | 174 | 5 | 11 | 1 |
| Manual removal of placenta | | | | |
| Induction of labor, no other operation * | 326 | 52 | 44 | 7 |

Not available separately in 1940-41

* The disparity in the relative incidence of induction of labor associated with stillbirths and with live births is, in very large measure, due to the fact that the stillbirth certificate, but not the certificate of live birth, contains a specific question regarding induction.

categories used in 1940 and 1941, low forceps, mid forceps, and "other operations," were further subdivided in 1942. A study of unpublished data by one of the authors elsewhere has shown that high forceps and forceps plane unspecified are associated with much much higher fetal loss than either low or mid forceps. As a matter of fact, in a 1 month sample run of the 1942 cards the stillbirth rates for both the former are ten times as high as the rates for low or mid forceps.

CODING OF OTHER MEDICAL INFORMATION

Congenital malformations and birth injuries of the infant (asked for on live birth certificates only) were merely coded "yes" or "no" in 1940-1941, but in 1942 are being coded by a simple one-column code, designed mainly to allow correlating by mechanical tabulation birth injuries with operative procedure and cause of neonatal death. For more detailed analysis, a hand-written card is made out for every case with a congenital malformation or birth injury, copying identifying information, physician's exact statement of nature of malformation and/or injury, physician's name, etc. These cards are used for the matching with the register of crippled children, and for detailed hand-tabulations of type of malformation, etc. The results of this matching for the 1940 births are shown in the 1940 Annual Report of the Division of Vital Statistics, and those for 1941 will be published shortly.

The code used for cause of stillbirth and the rules for treatment of joint causes are those developed by the U. S. Children's Bureau and approved by the Committee on Research and Standards of the American Public Health Association in 1940 for publication and trial in the United States. The tabulation and analysis of the 1940 stillbirths which appeared in the Annual Report

of the Division of Vital Statistics for that year give a measure of the degree of fallacy inherent in any system of selecting a preferred cause. For example, only 198 stillbirths in 1940 were charged to toxemia, while there were actually 391 or practically twice as many cases with toxemia stated as a complication; similarly, diseases in and accidents to the mother were charged with 101 of the stillbirths, but were mentioned as complications in 206 cases.

In coding the weight of the infant at birth, the following nine groups have been found most useful for our particular purposes:

I. *Non-viable prematures*

Less than 1,500 gm.; or 3 lbs., 5 oz.

II. *Viable prematures*

- (a) 1,500-1,749 gm. (3 lb., 5 oz.-3 lb., 13 oz.)
- (b) 1,750-1,999 gm. (3 lb., 14 oz.-4 lb., 6 oz.)
- (c) 2,000-2,249 gm. (4 lb., 7 oz.-4 lb., 15 oz.)
- (d) 2,250-2,499 gm. (5 lb.-5 lb., 7 oz.)

III. *Normal weight*

2,500-3,999 gm. (5 lb., 8 oz.-8 lb., 12 oz.)

IV. *Overweight*

- (a) 4,000-4,499 gm. (8 lb., 13 oz.-9 lb., 14 oz.)
- (b) 4,500-4,999 gm. (9 lb., 15 oz.-10 lb., 15 oz.)
- (c) 5,000 gm. and over (11 lb. and over)

TABULATIONS

We are confining the basic tabulations to a series of correlations of operative procedure with complications of pregnancy or labor, for eight specific groups each, of live births, stillbirths, neonatal deaths, and maternal deaths. While most of the births in New York State occur in hospitals, many mothers are still delivered at home; in 1941 they numbered 16,750, or 17.3 per cent. For this reason, as well as because of the recognized differences in home and hospital cases, this subdivision was added to the natural divisions into single and plural births, premature and full-term. Thus the tables correlating operative procedure with complications of pregnancy and labor are simultaneously specific for the three dichotomous classifications of plurality, gestation, and place of birth.

TABLE 3

*Stillbirth, Neonatal, and Maternal Mortality Rates**New York State, Exclusive of New York City, July, 1940-December, 1941*

| | <i>Total Births</i> | <i>Stillbirths per 1,000 Total Births</i> | <i>Deaths under 1 Month of Age, per 1,000 Live Births</i> | <i>Combined Infant Loss per 1,000 Total Births</i> | <i>Maternal Deaths per 1,000 Total Births</i> |
|-----------|-------------------------|---|---|--|---|
| Total | 146,820 | 24.5 | 25.2 | 49.1 | 1.6 |
| Premature | | | | | |
| Single | 7,384 | 234.4 | 310.5 | 472.1 | 7.8 |
| Plural | 1,033 | 131.7 | 328.9 | 417.2 | ... |
| Full term | | | | | |
| Single | 136,508 | 12.4 | 11.1 | 23.3 | 1.2 |
| Plural | 1,895 | 25.9 | 27.6 | 52.8 | 4.2 |

TABLE 4

*Fetal Loss * Rates per 1,000 Total Births**New York State, Exclusive of New York City, July, 1940-December, 1941*

| | <i>Total</i> | | <i>Single Full Term</i> | |
|-------------------------|-----------------|-------------|-------------------------|-------------|
| | <i>Hospital</i> | <i>Home</i> | <i>Hospital</i> | <i>Home</i> |
| Total | 48.5 | 51.9 | 23.6 | 22.3 |
| With complications | 107.9 | 185.3 | 58.4 | 91.7 |
| No complications | 23.2 | 27.7 | 10.0 | 11.9 |
| With operative delivery | 47.9 | 73.0 | 31.2 | 58.8 |
| No operative delivery | 48.8 | 47.6 | 19.3 | 19.0 |

* Stillbirths plus deaths under 1 month of age

By means of summary punch cards the basic tabulations are used as a source for numerous derivative tables combining live births and stillbirths, stillbirths and neonatal deaths, home, and hospital deliveries, etc. These combinations are obtained by the printing tabulator simultaneously for all the individual categories of operative procedures, with automatic controls and subtotals of any desired identifying categories. Another advantage of the summary cards is the ease with which the data can be accumulated and combined from year to year.

A few of the mortality rates are shown in Tables 3 and 4. It will be noted that while the fetal loss was practically the same for total home and total hospital deliveries, for cases with complications or with operative procedures the mortality rates were twice as high in home deliveries as in hospital deliveries. The same comparisons held for single full-term births only. The facts in detail, as well as an

analytical discussion of them which cannot be presented here, will be published in the near future.

Besides the tabulations for the entire area of the state, exclusive of New York City, detailed tabulations have been made showing for individual hospitals the births, stillbirths, and neonatal deaths, full-term and premature, and also the births by method of delivery.

This outlines the general procedure developed in the New York State Department of Health for handling the medical data on the birth and stillbirth certificates. In the time available for this paper, it is obviously impossible to consider details of procedure or present analyses of the results. It is hoped that this survey will furnish a basis for purposeful discussion here and elsewhere.

REFERENCES

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2. See, for example, *Maternal Mortality in New York City. Report by Committee on Public Health Relations*, New York Academy of Medicine. The Commonwealth Fund, New York, 1933.

Supplemental Birth Certificate Information Used in Planning Crippled Children and Maternal and Child Health Programs*

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THE effectiveness of state health work depends on the strength of the local health organizations, while the effectiveness of the local health activities depends upon the interest and understanding of the health officials and their ability to apply health knowledge. In any state, or even within a county, problems will vary. Thus an important function of any state health department is to see that individual community problems are recognized and solved in the order of importance. Every available source of information must therefore be utilized in planning these programs.

Wisconsin is fortunate because of the close working relationship of the Bureau of Maternal and Child Health with the Bureau of Vital Statistics. Early in the days of the expanding maternal and child health program in Wisconsin it was necessary for the bureau to assign one of its staff to make special statistical studies. After training in vital statistics and public health education, this individual was transferred to the Bureau of Vital Statistics,

through which office current reports and special studies are prepared.

Birth certificates are extensively used by local public health nurses, especially in the demonstration programs. Early in the organization of any county work this resource gives the public health nurse information as to the proportion of deliveries done by doctors, and through direct contacts with them she obtains their coöperation in referral of prenatal patients for home contacts. In planning home visits special consideration is given to prematures, first born babies, or babies born to mothers who have lost several children. At one time special follow-up was indicated on any delivery not attended by a doctor. This, however, is no longer a problem, since more than 99 per cent of total deliveries in Wisconsin are by physicians.

THE PROBLEM OF INFANT BLINDNESS

The use of birth certificates as a means of obtaining additional information was not a new departure in Wisconsin. In 1909, by order of the State Board of Health the question—"Was silver nitrate used to prevent infant blindness?"—was placed on the birth certificate. In addition a rule was passed requiring that silver nitrate be

* Presented at a Joint Session of the Maternal and Child Health and Vital Statistics Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

used in the eyes of all new-borns. This made it possible for immediate follow-up on any cases where silver nitrate had not been used. Prior to 1909 at least one-third of the admissions to the schools for the blind were because of ophthalmia neonatorum, whereas now only rarely is a case due to this cause. Another indication of the effectiveness of this procedure was a recent survey of the entire state of Wisconsin (population 3,137,587) which showed only 10 cases of blindness among children under 5 years of age. Four of these were known to have been caused from injuries and 3 were due to congenital conditions. Ophthalmia neonatorum was proved as the cause in only 3 of the total cases—one, an Indian child born in 1939 who had received no prophylactic care. This one question on birth certificates thus played a very important part in solving the problem of infant blindness.

LOCATING PHYSICALLY HANDICAPPED CHILDREN

The second supplement was added to the certificate in 1917—"Was child deformed or physically defective? Yes, No, Nature of Defect." Since that time this information has been used to locate handicapped children. As the current certificates are filed, a copy of any showing a deformity or physical defect is made. Each month these are sent to the Crippled Children's Division in the Department of Public Instruction. In 1941 this source was responsible for 22 per cent of all the crippled children registered. Immediately upon receipt of these certificates a card is made up for the individual child, the color of the card varying according to the type of defect. Defects are thus sorted by color and filed by county. Each field worker then receives the names and all available information on individuals in the territory she serves. If there has been no indication that the child has

died, she writes, telephones, or makes a personal visit to the physician who signed the birth certificate. Such conditions as harelip, cleft palate, and club feet, which need early correction are immediately followed up, and the others as indicated. Usually the family physician requests the visiting staff member of the Crippled Children's Division to consult with the family directly and work out with them a plan for care. Exceptions occur in families of adequate means who prefer to make their own arrangements. In case the local public health nurse has not already made a routine neonatal visit, she is notified if any special demonstration of nursing procedures is needed.

PROBLEMS RELATED TO OBSTETRIC PRACTICE

Wisconsin in 1940 again sought the coöperation of physicians in obtaining additional information on birth certificates, with the hope that it might bring a better understanding of existing problems. The questions were worded to obtain information on complications of pregnancy and labor, prenatal care, test for syphilis during pregnancy, type of delivery, indications for operative delivery, and degree of fetal asphyxia. A statement indicated that this information would not become a part of official copies of the birth certificate. The former questions of illegitimacy, use of silver nitrate, and presence of deformity and type were included in this portion of the certificate. It was felt that this information would be of special value in helping local physicians to recognize their problems and to stimulate interest in their solution. The bureau also hoped to gain further information for effective program planning.

CODING AND STATISTICAL PROBLEMS

The first problem was the coding of this material. A detailed code was de-

vised by the Bureau of Maternal and Child Health which would include as much of this information as possible. The certificates are coded by a clerk assigned to the Bureau of Vital Statistics. Arbitrarily, all material is coded currently as stated, regardless of discrepancies which occasionally arise because the information is not written in the proper space or there are direct contradictions. As questions arise in regard to coding, the certificates are laid aside and several times each week these certificates are cleared with the obstetrical consultant.

Since the old form of certificate without the supplement was coded as "No data," this group was relatively high the first year. A few physicians failed to understand the value of these additional questions; however, letters to these doctors resulted in their coöperation. In 1941 incomplete certificates were less than 3 per cent of the total.

A second problem confronting the

bureau was the tabulation and analysis of this supplemental information. It was necessary to take into consideration the fact that the statistical staff were crowded with work and that facilities were limited. The first tabulations of the new material were considered a special study. However, the present and more desirable point of view is that these tabulations are a routine part of the analysis of birth certificate information.

Each item of the supplemental code is tabulated separately. This is very essential, for once the complete sorting is done, the material is available for combining into any form desired. Table 1 which lists the complications of pregnancy shows how this material can be combined. By early detailed analysis it was possible to eliminate certain items which rarely occurred and to add combinations which appeared frequently.

The statistical consultants of the

TABLE 1
Complications of Pregnancy
1940-1941 Wisconsin Resident Birth Certificates

| | 1940 | | 1941 | |
|---|---------------|-----------------|---------------|-----------------|
| | <i>Number</i> | <i>Per cent</i> | <i>Number</i> | <i>Per cent</i> |
| Normal | 46,242 | 82.7 | 50,929 | 88.2 |
| Complications | 4,851 | 8.7 | 4,369 | 7.6 |
| No data | 4,816 | 8.6 | 2,451 | 4.2 |
| Total | 55,909 | 100.0 | 57,749 | 100.0 |
| <i>Analysis of Complications:</i> | | | | |
| Eclampsia | 137 | | 118 | |
| Toxemia | 1,283 | | 1,203 | |
| Renal disease | 343 | | 479 | |
| Placenta praevia | 238 | | 207 | |
| Premature separation of placenta | 193 | | 93 | |
| Antepartum bleeding (other) | 101 | | 137 | |
| Multiple births | 1,001 | | 797 | |
| Hyperemesis | 390 | | 217 | |
| Heart disease | 159 | | 117 | |
| Hydramnios | 91 | | 60 | |
| Diabetes | 65 | | 55 | |
| Tuberculosis | 23 | | 23 | |
| Syphilis | 54 | | 33 | |
| Appendicitis | 45 | | 29 | |
| Pelvic tumors | 57 | | 48 | |
| Other infectious diseases | 109 | | 70 | |
| Minor complications | 359 | | 373 | |
| Other incidental diseases associated with pregnancy | 100 | | 132 | |
| Maternal congenital defects | 15 | | ... | |
| Miscellaneous | 184 | | 303 | |
| Total | 4,947 | | 4,494 | |

Children's Bureau offered valuable assistance in the simplification of sorting procedures. It is to be hoped that the experience of the states that have been using this supplementary information will be of assistance in drawing up a uniform code. A physician's handbook covering such a code would undoubtedly increase the accuracy of recording. It might encourage doctors to fill out the birth certificate themselves rather than depending upon the obstetrical floor nurse. This practice was brought to light by examining certificates from certain large hospitals where almost exact uniformity was noted.

USE OF MATERIALS IN PROGRAM PLANNING

The primary contribution of the supplemental material is to obtain obstetrical morbidity information which previously had not been extensively available. From morbidity and mor-

ality data fatality rates can then be determined, and over a period of years it is hoped that trends may be obtained that will measure the effectiveness of the educational activities. When uniformly coded and tabulated it will be possible also to compare obstetrical results in various sections of the United States.

The actual uses of this material and some of the early results are interesting. One of the first items extensively used was the information on operative deliveries, particularly the information on cesarean sections. Previously the bureau had undertaken an extensive study of this subject and for a number of years had sent out an elaborate questionnaire to physicians on all cases where death followed cesarean section. Questionnaires were also sent to all hospitals and maternity homes to determine the number of hospital deliveries and sections. There was a 100 per cent return from the 225 hospitals and

TABLE 2
Indications for Cesarean Section
(Wisconsin 1940-1941)

| Indications | Wisconsin Sections for 1940 | | Wisconsin Sections for 1941 | |
|-------------------------------------|--------------------------------|----------|--------------------------------|----------|
| | Number | Per cent | Number | Per cent |
| Contracted pelvis and disproportion | 572 | 39.7 | 558 | 35.4 |
| Previous cesarean section | 214 | 14.9 | 316 | 20.0 |
| Toxemia | 110 | 7.6 | 86 | 5.4 |
| Placenta praevia | 106 | 7.4 | 121 | 7.7 |
| Reason not stated | 70 | 4.9 | 98 | 6.2 |
| Premature separation of placenta | 45 | 3.1 | 44 | 2.8 |
| Uterine inertia | 40 | 2.8 | 42 | 2.7 |
| Eclampsia | 35 | 2.4 | 40 | 2.5 |
| Prolonged labor | 33 | 2.3 | 58 | 3.7 |
| Elderly primipara | 31 | 2.1 | 26 | 1.6 |
| Breech | 28 | 1.9 | 22 | 1.4 |
| Other maternal complications | 19 | 1.3 | 10 | 0.6 |
| Occiput posterior | 16 | 1.1 | 31 | 2.0 |
| Transverse presentation | 14 | 1.0 | 13 | 0.8 |
| Previous pelvic surgery | 13 | 0.9 | 15 | 0.9 |
| Elective procedure | 13 | 0.9 | 31 | 2.0 |
| Maternal congenital defects | 12 | 0.8 | 10 | 0.6 |
| Contraction ring | 12 | 0.8 | .. | ... |
| Miscellaneous | 11 | 0.8 | 23 | 1.5 |
| Other cephalic malpresentation | 10 | 0.7 | 6 | 0.4 |
| Heart disease | 9 | 0.6 | 10 | 0.6 |
| Ruptured uterus | 8 | 0.6 | 5 | 0.3 |
| Fetal asphyxia | 8 | 0.6 | 7 | 0.4 |
| Diabetes | 4 | 0.3 | 1 | 0.1 |
| Prolapsed cord | 3 | 0.2 | 0 | 0.0 |
| Fetal malformation | 3 | 0.2 | 4 | 0.3 |
| Total | 1,439 | 99.9 | 1,577 | 99.9 |

maternity homes licensed for obstetrical care. In 1934 there were 868 sections performed in the state, while in 1939 there were 1,221 sections. The number of cesarean sections reported from the birth certificates showed 1,439 sections for 1940 and 1,577 sections during 1941. These 1940 and 1941 figures correspond very closely with the number obtained by the more laborious and less accurate method of direct questionnaires.

Additional information was also made available as to type and indication for section. In 1940 we found 86.4 per cent of the sections were of the classical type, 13.1 per cent were low cervicals, and 0.5 per cent were of the radical type. This contrasts with the 82.4 per cent classical sections, 16.2 per cent low cervicals, and 1.3 per cent radical type shown in 1941. The downward trend in classical sections and the slight increase in the low and radical

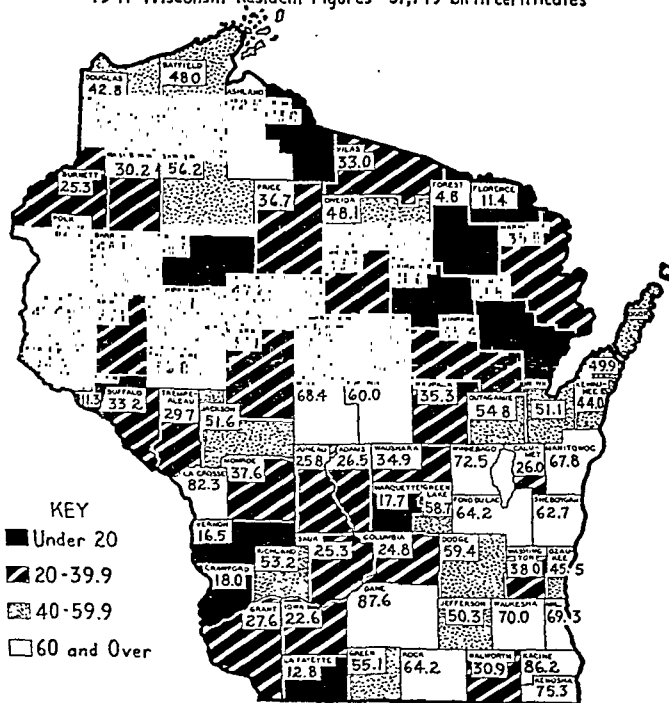
type of section may in part be due to the intensive postgraduate approach to this problem. The indications given for cesarean sections are listed in Table 2. Information of this type will be of great value in observing future trends.

Recent developments very clearly show the value of gathering all available information on births and using this constantly in program planning. As a direct result of the presentation of cesarean section data at the Medical Society meeting in Wisconsin a year ago, local physicians have initiated studies and discussions in their own communities. In certain instances hospital staffs have set up regulations requiring consultation prior to any major obstetrical operation. Several leading obstetricians have presented additional material on cesarean sections and emphasized the responsibility of the medical profession toward such problems. Favorable changes are definitely oc-

FIGURE 1

WAS MOTHER'S BLOOD TESTED FOR SYPHILIS?

1941 Wisconsin Resident Figures - 57,749 birth certificates



State Average - 57.5%

curing as a result of tangible information properly presented to the medical profession.

When this supplemental information is tabulated by county, it stimulates the spirit of competition which so frequently seems to further health programs. An example of this is the use of material on the test for syphilis. This information when tabulated by counties as shown in Figure 1 reveals a range from 4.8 per cent to 87.6 per cent in the use of prenatal Wassermanns. When such maps are shown at medical meetings physicians in those counties having the low rates, which show up as black on the map, immediately want to improve their record. The question as worded on the birth certificate—"Was mother's blood tested for syphilis?"—may be confusing as some certificates indicating "yes" definitely stated that this was the premarital Wassermann test which is required in Wisconsin. These maps have also been used in individual contact work with physicians and in postgraduate medical programs. One interesting comment of physicians on this question has been their statement that they have used it to encourage reluctant patients to accept the procedure by stating that the State Board of Health requires them to report it on the birth certificate. After such statement a patient rarely refuses.

Information on prenatal care is considered inadequate. The question as worded—"At what period of pregnancy did patient first consult you?"—gives insufficient information. Undoubtedly some of the early contacts are made for diagnosis and the physician may be seen only infrequently during the intervening months. A further question asking for total prenatal visits would be valuable in estimating the adequacy of prenatal care. The significant point revealed is that among the Wisconsin births in 1941 only 4.1 per cent re-

ceived no medical supervision during the prenatal period, and that in 50.3 per cent medical contact was made during the first trimester of pregnancy.

Trends are apparently changing to earlier prenatal care as indicated by the reports of physicians mentioning the effectiveness of educational programs in bringing expectant mothers to them earlier.

Now for the first time statistical information is available which in spite of limitations may over the years give more tangible evidence of progress. It will make possible comparative studies showing how early prenatal care influences the various complications of pregnancy and labor.

More detailed information on prematurity and its relation to complications of pregnancy and delivery, as well as to asphyxia at the time of birth, is available through this source. By special tabulations it has been possible to present county information on prematures born at home and in hospitals. This facilitates allocation of incubators and encourages their use by doctors.

Supplemental birth information has been of great value in planning programs for postgraduate medical education. During the year there have been opportunities for presenting to the medical profession the fact that toxemia is the leading complication of pregnancy, and that prolonged labor is the most frequent complication of labor. As a result, these problems were given a most prominent place at the recent State Medical Society meeting. Tabulations of all supplemental information by counties has proved very useful in presenting local problems to the county medical societies. Interest is stimulated in their own problems and obstetrical results.

While decreases are to be expected in the leading causes of obstetrical morbidity and mortality, there may be unavoidable setbacks in the years im-

mediately ahead because of the present world situation. In these pressing times the supplemental birth certificate material offers a new source of readily available information. Each certificate is a briefly summarized obstetrical history from which may be obtained information concerning obstetrical morbidity. Over a period of years, trends will be

available to check progress made in meeting specific problems. In order to be of the greatest possible value there should, however, be uniformity in coding and classification. Every director of public health activities should find supplemental birth data of value in program planning, provided it is properly used and interpreted.

Bottlenecks in Our War Nursing Program*

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"TIME is short" for the nursing profession to undertake the tremendous adjustments called for if it is to make its maximum contribution to this war. "Time is short" for us to review our programs and break the bottlenecks that slow down or even stop our progress.

Today public health nurses have the opportunity and the responsibility of exerting every ounce of leadership they possess. Courageous leadership is needed throughout the nursing profession. It is needed in our relations to the fields of public health, medicine, hospital administration, nutrition, education, and social work. It is needed in relation to the public, the family at home, the worker at work, the citizen as a member of an organized group, the voter at the polls, and it is needed with relation to the various branches of national, state, and local government.

Before this leadership can be exerted effectively, we must have first, a clear picture of the total war nursing program; second, we must be completely objective in analyzing the bottlenecks in the program; and third, we must be determined to break the bottlenecks and get proper action.

At the risk of oversimplification, I would say that our war nursing pro-

gram consists of four parts: (1) increasing the supply of students; (2) greater use of auxiliary workers both paid and volunteer; (3) finding and distributing graduate nurses equitably for maximum war needs; (4) provision of proper working conditions in terms of hours, wages, and living conditions. No one of these four points of the program can assume greater importance than the other if satisfactory progress is to be made.

Unprecedented demands upon graduate nurses from the armed forces and civilians alike make it necessary to provide a reservoir of potential graduate nurses by increasing the number of students in schools of nursing. Taking cognizance of the seriousness of the situation, Congress made available on July 1, 1941, the first federal aid for nursing education. The sum of \$1,250,000 was appropriated for this purpose to the U. S. Public Health Service. Later a deficiency of \$600,000 was granted, and on July 1, 1942, the appropriation was increased to \$3,500,000.

The 1943 goal of 65,000 new students in schools of nursing is an increase of 10,000 over the 1942 goal. An analysis of the spring classes indicates that this goal is not being met. Actually, the 65,000 quota for new students represents the present training facilities of schools of nursing rather than the true needs of the country. If

* Founded on a paper presented before the Public Health Nursing Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

schools were able to handle the number of new students necessary to meet nursing shortages, the quota would be set at 84,000 for the year beginning July 1, 1943.

What are the bottlenecks to student enrollment?

One is public understanding. Here is a rich field for the public health nurse in her contacts with the lay public. You, better than anyone else, can help prospective students to overcome parental objection.

Monetary rewards are also a major problem. If college and high school girls can go immediately into war work at a good salary, why should they spend two to three years in nursing without salary except in the form of living expenses? To counteract this situation, we have tuition scholarships available through the U. S. Public Health Service programs, and the National Nursing Council for War Service is raising a large National Scholarship Fund. However, it may be necessary to go further and provide some sort of reimbursement to students preparing for war nursing.

We face also the question of accelerated courses. Here again we have bottlenecks—first, in our resistance to the idea. Perhaps if we study carefully the recommendations prepared by the National League of Nursing Education and see how acceleration can be effected soundly, our resistance will break down. The National Nursing Council for War Service recommends that for high school students, theoretical courses in nursing be completed in 30 months, and for college students in from 24 to 28 months, depending on their backgrounds and achievement.

Suppose we find and bring back into service every graduate nurse; suppose we meet our quotas for student nurses; even that will not be enough! We must develop an active program for preparing and employing auxiliary workers. This

is chiefly a problem for each local hospital and health agency. Nationally, the program for volunteer nurses' aides is administered by the American Red Cross in coöperation with the Office of Civilian Defense. Here again, public health nurses are in a strategic position to awaken public interest and to encourage agencies to plan for the wise use of these available helpers.

With the realization that competition from industry and uniformed military auxiliaries is making our quotas increasingly difficult to reach, many members of the nursing and medical profession have presented suggestions for a remedy. These have gone through the mill of committee meetings. The outcome has been the Student War Nursing Reserve, which was approved by the Health and Medical Committee on January 26, 1943, submitted to the U. S. Public Health Service, and is now being considered by Congress in the form of the Bolton Bill.

This plan attempts to meet the competition in two ways, namely, by providing a new appeal and by financial rewards. The appeal is in the setting up of a distinctive corps with rank, insignia, and, possibly, street uniforms. The financial rewards include maintenance, tuition, and a modest monthly stipend for personal expenditures. The proposal is that the government share with the schools of nursing in these costs.

It is important to mention that the Student War Nursing Reserve Plan includes provision for the acceleration of the basic course to either 24 or 30 months. This leaves each school of nursing free to make such plans for acceleration as fit into its local situation. Whereas acceleration presented a difficult adjustment at first to nurse educators, the swift change in public psychology, in educational practices in other fields and in the course of the war will undoubtedly win many schools

of nursing over to instituting the fastest and soundest type of acceleration consistent with the proper care of patients. Where state laws permit, the nurse who has completed her theory might be graduated. She can then apply for a full-time job in the military or appropriate civilian services. If she has omitted certain specialties in her accelerated program, and cannot graduate, some plan should be worked out for her to make up these deficiencies when the war is over.

For students in their senior year who have completed their theory, it is proposed to arrange affiliations in Army, Navy, governmental and civilian hospitals upon the approval of the parent school. It is further proposed that these students, known as "cadet nurses," receive a modest stipend and in addition, because it will be necessary for them to live outside of the hospital, receive from the hospitals the difference up to possibly three-fourths of the salary of a graduate nurse. In these proposals, there is frank admission that student nurses serve while they are learning.

Letters pour in to government offices protesting that many other types of students are paid by the government for their education, whereas nurses give service while learning, pay a tuition, and get no wage. Let us once and for all differentiate between nursing education and nursing service to patients. For the latter, let us agree that the student nurse be paid, and come to a conclusion as to whether the government, the hospitals, or both should foot the bill.

Greater use of auxiliary workers appears to be the only immediate solution to the problem of overcoming the lack of facilities for training additional new students. As a pattern for this phase of the program we have the pioneer work of the American Red Cross, together with the recently de-

veloped activities of the Office of Civilian Defense. Suggestions for making the best use of volunteer participation are to be found in *Volunteers in Health, Medical Care and Nursing*, which may be procured from the Office of Civilian Defense, Washington, D. C.

Before a health department or hospital expands its use of auxiliary workers or volunteers, a critical analysis should be made of jobs done by professional workers for the purpose of ascertaining what duties can be delegated with safety to non-professional people. Agencies that have not made such studies and allocations of jobs are urged to do so immediately.

Reports are still being received which show that graduate nurses in some hospitals are serving trays, filling water glasses, and cutting flowers. In some health departments, graduate nurses trained at considerable expense in the specialty of public health, consume precious time and skill in doing clerical work, making dressings, and serving as receptionists. Critical nursing shortages cannot be met if such waste of nurse power continues.

To supply and distribute graduate nurses equitably for maximum war needs, both military and civilian, we need first to have in each community some central place where the name and pertinent data about each of the estimated 400,000 nurses of the country are assembled. In 1941, our national survey reported some 300,000 graduate nurses—one bottleneck was revealed when it was found that some 100,000 nurses, mostly those retired or inactive—did not reply. That was before Pearl Harbor. In January, 1943, a new post card survey was undertaken by the U. S. Public Health Service working with the national, state, and local Nursing Councils for War Service.

Concurrent with a survey of available supply, should go a study of the

nursing needs in the community. For this purpose, the National Nursing Council for War Service has published *A Guide to the Distribution of Nursing Service During War*. Has your local nursing council used this guide? If not, that is a bottleneck. Of what good is to know where the nurses are unless we know where they must be used? We know that the armed forces will need 66,000 nurses by the end of 1944. We know their needs may go far beyond that number and that they have priority. We know also that government hospitals and public health services, supplied through the U. S. Civil Service Commission, need several thousand nurses. How can these demands be met, and at the same time maintain a reasonable, local, civilian nursing strength? Part of the answer is for each locality to analyze the total nursing situation, to eliminate all duplications, promote economies of nursing time, and utilize to the fullest auxiliary nursing personnel.

It is urgent that we think also of the nursing needs of the new communities and new industries arising out of the war situation. Many of them have no organized care of the sick; some may have as yet no health departments. In nursing we have well accepted patterns for organizing, administering, and financing local nursing service. Each state Nursing Council for War Service should work with its state health department in planning for a proper distribution of nursing service wherever it is needed.

Then comes a tough problem—that of fitting the right nurse to the right war job. For this, the National Nursing Council for War Service has issued *Priorities for Nurses*. Have you read it? If not, that is a bottleneck.

To put these priorities into effect is now our major problem. We are doing everything we can to make the voluntary system work. But the National

Nursing Council feels the need for whatever financial assistance, moral suasion, and authority the government has, and recommended that a Nursing Supply and Distribution Unit be set up under the War Manpower Commission. The purpose of the Unit, as the name implies, is:

1. To determine the availability of nurses for service in the war emergency.
2. To aid in the equitable distribution of nurses so that the nursing needs of the armed forces and of civilians will be adequately met. This distribution will be on a voluntary, not a compulsory, basis.

Finally, we come to the fourth point of the program—that of good working conditions for students, graduates, and auxiliaries. Civilian hospitals are now confronted with a new type of competition, for the Army and Navy pay bill provides nurses with \$150 a month. For some time, the Civil Service Commission has paid junior nurses \$1,620 a year and staff nurses \$1,800. Government salaries for nursing are thereby setting a precedent for the private hospitals to consider as one factor in attracting and maintaining staff.

Hours of work, incentives for advancement, provision for sickness and old age retirement, opportunities for recreation, appropriate living quarters, and good food are some of the other requirements of good personnel policies.

Just one word about the housing of nurses. Emphasis is being placed on letting faculty and senior students live outside of the institution in the community. What we need increasingly is the community viewpoint with regard to nursing. We need to see the patient in relation to his family and his environment. But try as we may to develop that point of view, residence in dormitories seems to have blinded many of our best and most promising faculty and students. The housing shortage may be a blessing in disguise, for living in the community will undoubtedly give

nurses a change in scenery, get them away from rehearsing the day's professional events, and broaden their interest in community activities.

Perhaps one of our major bottlenecks is that we have let nursing be divided into too many tight compartments. Today we must see nursing as a whole. The best way to do this is to lend every support to our state and local Nursing Councils for War Serv-

ice. Through them should come the answers to the distribution of graduate nurses, the increase in the supply of students, and the use of auxiliaries. Through them you make your contacts with the National Nursing Council for War Service and the government's Subcommittee on Nursing. Through them, you may show what leadership public health nursing is able to exert in wartime.

Epidemiology of Pneumococcus Pneumonia

A Study, Including Bacteriological and Serological Observations
in a Rural Community during a Season of High Incidence *

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BETWEEN January 11 and May 1, 1940, a study was made of the incidence of pneumococcus infection in a sample population in Northville, Fulton County, N. Y. Northville is a relatively isolated village which, at that time, had a population of 1,111. Just prior to the start of the investigation an unusual incidence of Type 1 pneumococcus pneumonia had been noted in

this particular vicinity (see Table 1, A and B).

The sample population was random on a geographical basis, alternate households within the village being enrolled for study. That the sample was well selected is borne out by close correlation in sex and age distribution between it and the population of the village at large as recorded in the 1940

TABLE 1

| A Pneumonia Cases in Fulton County and Northville | | | | B Pneumonia Cases Occurring in Northville from July 1, 1939 to June 30, 1940 | | |
|---|--------------------------|------------|-----|--|---------------|----------------------|
| Year * | Number of Reported Cases | | Age | Sex | Date of Onset | Pneumococcus Type |
| | Fulton Co. | Northville | | | | |
| July 1, 1936-June 30, 1937 | 174 | 6 | 62 | M | 8- 7-39 | 10 |
| July 1, 1937-June 30, 1938 | 124 | 2 | 83 | M | 12- 8-39 | 1 |
| July 1, 1938-June 30, 1939 | 164 | 6 | 51 | F | 12-15-39 | 1 |
| July 1, 1939-June 30, 1940 | 151 | 12 | 49 | M | 1- 1-40 | 1 |
| July 1, 1940-June 30, 1941 | 151 | 5 | 69 | F | 1-11-40 | 16 |
| July 1, 1941-June 30, 1942 | 142 | 8 | 57 | M | 1-25-40 | 1 |
| | | | 31 | M | 2- 1-40 | 1 |
| | | | 21 | M | 2- 4-40 | 7 |
| | | | 78 | F | 2-14-40 | 1 |
| | | | 8 | M | 3-17-40 | 1 & 19 |
| | | | 76 | M | 4-13-40 | 16 |
| | | | 5 | M | 4-24-40 | 1 |

* The figures are given for July to July so that all the cases that occurred in any one "pneumonia season" will appear together.

* Presented before the Epidemiology Section of the American Public Health Association at the Seventy-First Annual Meeting in St. Louis, Mo., October 29, 1942.

census. The group was surveyed 4 times in all. The first survey, during which the enrollment was made, con-

sumed approximately 6 weeks (January 11–February 18). Subsequent surveys were accomplished in 3–4 weeks each (February 19–March 13; March 14–April 2; April 3–May 1, respectively). Seventy-eight households comprising 271 individuals were enrolled in the initial survey. Seventy-four households with 259 individuals remained under observation throughout the study period.

At the first interview, identifying data were obtained for each member of the household and further facts of possible significance such as general health, known contact with pneumonia, and gregarious activities were noted in detail for the 30 day interval immediately preceding the interview. At each subsequent survey these data were brought up to date.

Also, at each survey, cultures were made from the pharynx and nasopharynx of the individuals in the study group. One swab was passed thoroughly over the pharyngeal wall and tonsils or tonsillar fossae. Another was introduced through each nostril into the nasopharynx until it touched the posterior nasopharyngeal wall. In this position it was rotated gently against the membranous surface. Both swabs were combined in a tube of blood broth and incubated at the field laboratory which was set up in the central school in Northville. In no case did an interval of more than 3 hours elapse between culture and incubation. This laboratory was equipped and staffed to examine the cultures for the presence of pneumococci of all types. Whenever these microorganisms were isolated they were typed according to the Cooper classification.

The details of the bacteriological technic briefly were as follows:

Culture media included (1) beef infusion broth with 1 per cent dextrose and 5 per cent horse blood, (2) beef infusion broth with proteose peptone and 0.02 per cent dex-

trose, and (3) blood agar plates. After the blood broth cultures had been incubated for approximately 6 hours at 35° to 37° C., a mouse weighing from 18 to 22 gm. was inoculated intraperitoneally with 0.5 ml. of the culture, and a blood agar plate was streaked. Mice that lived overnight were subjected to peritoneal puncture, and the aspirated exudate was examined by the Neufeld technic with Type 1 serum only. Mice that died were autopsied and the peritoneal exudate was examined for all types directly by the Neufeld technic. In addition, the exudate and heart blood were cultured on blood agar which was then incubated for 18 to 24 hours. If the type had been previously determined, the typing was confirmed with the homologous anti-serum by the examination of a suspension of colony fishings picked from the plate; otherwise a complete examination was made to determine the type. Whenever the examination of colonies which were morphologically characteristic of pneumococci failed to reveal a type, solubility tests were undertaken with a 1 per cent solution of sodium desoxycholate and all soluble strains were saved for further study at the central laboratory in Albany. Mice that lived were sacrificed and autopsied approximately one week after injection, and the peritoneal fluid and heart blood were examined as described. The possibility of the occurrence of more than one type of pneumococcus was always borne in mind.

During the second survey and again in the fourth, blood specimens were obtained from a large number of the study group. These specimens were analyzed by mouse protection tests for Type 1 pneumococcus antibodies.

One-tenth ml. of serum was tested in white mice with different doses of a highly virulent 16 hour broth culture of the standard strain. The minimum lethal dose was determined in each test according to the standard method, and the estimate of the protective activity was based on similar results in at least two tests.

During the study period 7 cases of pneumococcus pneumonia developed in the Northville area. These were made the subject of separate investigation. Three of these cases occurred among households enrolled in the study group. However, only the culture results obtained at the regular surveys are in-

TABLE 2

Frequency of Types of the Pneumococcus Recovered from the 267 Individuals of the Study Group

| <i>Result of Culture</i> | <i>Individuals</i> | <i>Per cent of Total</i> |
|---------------------------|--------------------|--------------------------|
| Pneumococci not recovered | 100 | 37.5 |
| Pneumococci recovered | 167* | 62.5 |
| Type 1 | 24 | 9.0 |
| 2 | 6 | 2.2 |
| 3 | 24 | 9.0 |
| 4 | 5 | 1.9 |
| 5 | .. | .. |
| 6 | 11 | 4.1 |
| 7 | 4 | 1.5 |
| 8 | 7 | 2.6 |
| 9 | 2 | 0.7 |
| 10 | 2 | 0.7 |
| 11 | 18 | 6.7 |
| 12 | .. | .. |
| 13 | 9 | 3.4 |
| 14 | 11 | 4.1 |
| 15 | 3 | 1.1 |
| 16 | 7 | 2.6 |
| 17 | 2 | 0.7 |
| 18 | 7 | 2.6 |
| 19 | 32 | 12.0 |
| 20 | 4 | 1.5 |
| 21 | 6 | 2.2 |
| 22 | 5 | 1.9 |
| 23 | 6 | 2.2 |
| 24 | 2 | 0.7 |
| 25 | 3 | 1.1 |
| 26 | .. | .. |
| 27 | 1 | 0.4 |
| 28 | 2 | 0.7 |
| 29 | 10 | 3.7 |
| 30 | .. | .. |
| 31 | 8 | 3.0 |
| 32 | 1 | 0.4 |
| Unclassified | 32 | 12.0 |

* Each type found in a single individual is tabulated separately, making a total of 254 strains of pneumococci among 167 individuals positive for pneumococci.

cluded in the analysis of the carrier status of the sample population. Thus, although there were three known Type 1 cases in the study group none of them happened to harbor Type 1 pneumococci at the time of survey and these three therefore do not appear in the tables concerned with the incidence of pneumococcus infection in the sample population as determined by culture survey technic.

As the term "pneumococcus infection" is used in this paper, it denotes the presence of pneumococci detected as the result of pharyngeal or nasopharyngeal culture or sputum examination, regardless of whether or not the

individual concerned was a pneumococcus carrier in the usual restricted sense of the word, or a case of pneumococcus pneumonia.

Of the 267 individuals from whom cultures were taken, 248 of them at all four surveys, 167 (62.5 per cent) were found to be pneumococcus carriers at some time (Table 2). Pneumococcus Type 19 occurred in 12 per cent, Types 1 and 3 in 9 per cent, and Type 11 in 6.7 per cent of the study population. One hundred individuals carried only one type. Sixty-seven (40 per cent) of those positive carried more than one type; 52 had 2 types; 12, 3 types; 1, 4 types; and 2, 5 types simultaneously.

In general, types detected in a given individual did not show much tendency to persist (Table 3). Of 254 strains recovered in the study group, 198 (78 per cent) were recovered only once, 48 (19 per cent) twice, 7 (3 per cent) three times, and only 1 strain four times from the same individual. Types encountered more than once in a given individual occurred twice as frequently in consecutive cultures as they did intermittently.

The proportion of pneumococcus carriers of all types detected was con-

TABLE 3

Repetition of Same Type Pneumococcus in the Same Individual

| <i>Type</i> | <i>Total</i> | <i>Number of Times Recovered per Individual *</i> | | |
|--------------|--------------|---|----|----|
| | | 2 | 3 | 4 |
| All Types | 254 | 48 | 7 | 1 |
| 1 | 24 | 7 | .. | .. |
| 3 | 24 | 5 | 1 | .. |
| 6 | 11 | 3 | 2 | .. |
| 8 | 7 | .. | 2 | .. |
| 11 | 18 | 7 | 1 | .. |
| 14 | 11 | 2 | .. | .. |
| 16 | 7 | 2 | .. | .. |
| 19 | 32 | 8 | .. | 1 |
| 20 | 4 | 1 | .. | .. |
| 29 | 10 | 5 | 1 | .. |
| 31 | 8 | 3 | .. | .. |
| Unclassified | 32 | 5 | .. | .. |

* Whether recovered in successive cultures or not.

TABLE 4

Distribution of Most Common Types of Pneumococci by Age and Sex

| Age and Sex | Total Number Individuals Cultured | Positive for Pneumococci | | | | | | |
|-------------|--|--------------------------|----------------------------------|----------------|----|----|----|-----------------------|
| | | Total | | Number by Type | | | | |
| | | Number | Per cent of Total Cultured | 1 | 3 | 11 | 19 | All Other Types |
| Males | 122 | 86 | 70.5 | 9 | 16 | 12 | 19 | 38 |
| Under 10 | 26 | 22 | 84.6 | 4 | 2 | 5 | 7 | 7 |
| 10 to 19 | 14 | 10 | 71.4 | 1 | 1 | 2 | 5 | 2 |
| 20 and Over | 82 | 54 | 65.9 | 4 | 13 | 5 | 7 | 29 |
| Females | 145 | 81 | 55.9 | 15 | 8 | 6 | 13 | 42 |
| Under 10 | 28 | 16 | 57.1 | 11 | 1 | 2 | 2 | 2 |
| 10 to 19 | 21 | 11 | 52.4 | .. | 2 | 4 | 1 | 5 |
| 20 and Over | 96 | 54 | 56.3 | 4 | 5 | .. | 10 | 35 |
| Total | 267 | 167 | 62.5 | 24 | 24 | 18 | 32 | 80 |
| Under 10 | 54 | 38 | 70.4 | 15 | 3 | 7 | 9 | 9 |
| 10 to 19 | 35 | 21 | 60.0 | 1 | 3 | 6 | 6 | 7 |
| 20 and Over | 178 | 108 | 60.7 | 8 | 18 | 5 | 17 | 64 |

TABLE 5

Distribution of Positive Cultures According to the Most Common Types by Weeks Throughout Study Period

| Week Begin- ning | Total Number Cul- tures | Total Number Posi- tive | Per cent Positive | Number by Pneumococcus Type | | | | | | | | Per cent of Total Cultures by Type | | | |
|------------------------|----------------------------------|----------------------------------|----------------------|-----------------------------|----|----|----|----|----|----|-------------------|---------------------------------------|------|-----|----|
| | | | | | | | | | | | Unclass- ified | All Others | 1 | 3 | 19 |
| | | | | 1 | 3 | 6 | 11 | 19 | 29 | 38 | 120 | | | | |
| Total | 1,061 | 287 | 27.0 | 36 | 34 | 20 | 28 | 43 | 18 | 38 | 120 | 3.4 | 3.2 | 4.1 | |
| Jan. | | | | | | | | | | | | | | | |
| 7 | 28 | 8 | 28.6 | .. | 2 | .. | .. | 2 | 2 | 1 | 3 | ... | 7.1 | 7.1 | |
| 14 | 35 | 9 | 25.7 | 1 | 1 | .. | 1 | 3 | .. | 4 | .. | 2.9 | 2.9 | 8.6 | |
| 21 | 46 | 11 | 23.9 | 2 | .. | .. | .. | 1 | .. | 1 | 8 | 4.3 | ... | 2.2 | |
| 28 | 46 | 12 | 26.1 | .. | 1 | .. | 4 | 3 | .. | 1 | 4 | ... | 2.2 | 6.5 | |
| Feb. | | | | | | | | | | | | | | | |
| 4 | 58 | 13 | 22.4 | .. | 2 | 2 | 1 | .. | 1 | 1 | 8 | ... | 3.4 | ... | |
| 11 | 70 | 17 | 24.3 | 1 | 1 | 3 | .. | 3 | .. | 1 | 10 | 1.4 | 1.4 | 4.3 | |
| 18 | 60 | 16 | 26.7 | .. | 1 | .. | .. | .. | 1 | 3 | 11 | ... | 1.7 | ... | |
| 25 | 55 | 6 | 10.9 | 2 | .. | 1 | .. | 1 | 1 | .. | 2 | 3.6 | ... | 1.8 | |
| Mar. | | | | | | | | | | | | | | | |
| 3 | 66 | 40 | 60.6 | 6 | 4 | 3 | 8 | 6 | 3 | 3 | 16 | 9.1 | 6.1 | 9.1 | |
| 10 | 73 | 15 | 20.5 | 4 | 1 | 3 | .. | 3 | .. | 1 | 7 | 5.5 | 1.4 | 4.1 | |
| 17 | 99 | 36 | 36.4 | 4 | 2 | 2 | 4 | 9 | 4 | 7 | 14 | 4.0 | 2.0 | 9.1 | |
| 24 | 95 | 14 | 14.7 | 3 | .. | .. | 4 | .. | 2 | 2 | 6 | 3.2 | ... | ... | |
| 31 | 98 | 15 | 15.3 | 1 | 4 | 3 | 1 | 3 | .. | 3 | 1 | 1.0 | 4.1 | 3.1 | |
| Apr. | | | | | | | | | | | | | | | |
| 7 | 106 | 23 | 21.7 | 1 | 2 | .. | 3 | 6 | 4 | 3 | 6 | 0.9 | 1.9 | 5.7 | |
| 14 | 91 | 38 | 41.8 | 7 | 11 | 3 | .. | 2 | .. | 5 | 21 | 7.7 | 12.1 | 2.2 | |
| 21 | 14 | 8 | 57.1 | 3 | 2 | .. | 1 | 1 | .. | 1 | .. | 21.4 | 14.3 | 7.1 | |
| 28 | 21 | 6 | 28.6 | 1 | .. | .. | 1 | .. | .. | 1 | 3 | 4.8 | ... | ... | |

TABLE 6

Incidence of Known Acute Upper Respiratory and Gastrointestinal Illnesses Among Pneumococcus Carriers and Non-carriers During Entire Study Period

| Infection Status | Total Number Individuals Cultured | Number of Cases of Illness | | Per cent of Total Number Cultured | |
|----------------------------|--|----------------------------|-----------------------|--------------------------------------|-----------------------|
| | | Upper Respiratory | Gastro- intestinal | Upper Respiratory | Gastro- intestinal |
| | | | | | |
| Pneumococcus Not Recovered | 100 | 78 | 13 | 78.0 | 13.0 |
| Pneumococcus Carrier | 167 | 134 | 19 | 80.2 | 11.4 |
| Total | 267 | 212 | 32 | 79.4 | 12.0 |

sistently higher for males than females in all age groups (Table 4). This is compatible with the findings reported by Gundel and Okura¹ and by Ardelean.²

Of a total of 1,061 cultures in the sample group 287 (27 per cent) were positive for pneumococci (Table 5). For the first 7 weeks of the study the proportion of positive cultures remained quite constant. The subsequent irregularity and the high peak of the 9th week during which 60.6 per cent of the cultures taken were positive, remains without a satisfactory explanation. All controllable factors were apparently kept constant. No single pneumococcus type assumed predominance. The age distribution of those cultured during this week was essentially the same as for the total study group. There was no relation to particularly unfavorable weather conditions. The incidence of acute respiratory infection did not change appreciably, nor was there any other form of illness prevalent, with the exception of a small number of cases

of an acute gastrointestinal disturbance the occurrence of which, however, seemed to bear no constant time relationship to the incidence of pneumococcus infection. Furthermore, it will be seen from Table 6 that there appears to be no correlation between the occurrence of either acute upper respiratory infection or gastroenteritis and the incidence of pneumococcus infection in the study population as a whole.

The incidence of pneumococcus infection of all types encountered in households at each of the four surveys does not show appreciable variation (Table 7) but Type 1 appears to have been somewhat more prevalent after the first survey.

Seventy (89.7 per cent) of the 78 households in the sample population harbored one or more infected persons, in this instance all carriers, at some time during the study (Table 8). In approximately 20 per cent of these the same type occurred simultaneously in two or more individuals and in 26 per cent the same type was recovered at

TABLE 7

Households Found to Have One or More Members Infected with Pneumococci of Any Types and Type 1 According to Survey

| Survey | Total | | Households | | Per cent of Households | |
|--------|------------|-------------|----------------------|----------------------|------------------------|----------------------|
| | Households | Individuals | Type 1 | | Type 1 | |
| | | | Pneumococcus Present | Pneumococcus Present | Pneumococcus Present | Pneumococcus Present |
| 1st | 78 | 257 | 39 | 2 | 50.0 | 2.6 |
| 2nd | 75 | 253 | 41 | 9 | 54.7 | 12.0 |
| 3rd | 74 | 253 | 35 | 7 | 47.3 | 9.5 |
| 4th | 74 | 248 | 43 | 7 | 58.1 | 9.5 |

TABLE 8

Incidence of Pneumococcus Infection among Households Composed of Adults Only and Households Composed of Adults and Children

| Composition of Household | Total Number Households | Number Positive | | Per cent Positive | |
|--------------------------|-------------------------|-----------------|--------|-------------------|--------|
| | | All Types | Type 1 | All Types | Type 1 |
| Total Households | 78 | 70 | 14 | 89.7 | 17.9 |
| Adults Only | 37 | 30 | 2 | 81.1 | 5.4 |
| Adults and Children | 41 | 40 | 12 | 97.6 | 29.3 |

different surveys. Type 1 was encountered in 14 (17.9 per cent) of these 78 households.

Recent studies of pneumococcus carriers by Stebbins,³ Mackenzie,⁴ and Smillie,⁵ have indicated that children seem more susceptible to infection than adults, and it has been further shown by one of us⁶ that they play an important rôle in the dissemination of pneumonia. The relatively small difference in the incidence of pneumococcus infection of all types in households with or without children of school or preschool age becomes marked if Type 1 is considered alone (Table 8). This type occurred in 29.3 per cent of the households with children and in only 5.4 per cent of those composed exclusively of adults of 20 years or older. This observation is consistent with the finding already mentioned that the major portion of those with Type 1 infections are under 10 years of age. The numbers of children of school and preschool age were too small, however, to permit separation, as was attempted by Mackenzie,⁴ of the effect of age

per se from the effect of school contacts as a factor closely linked with age.

As stated, at each survey careful inquiry was made into the activities and close personal contacts of each subject. In the following analysis contacts are defined as "household" to mean persons residing permanently with the family group in question, and as "extra-household" to mean individuals who were not in residence but had a minimum contact of a close nature with the person in question on the average of at least 1 hour a week.

As a collateral study to that of pneumococcus carriers in the sample population, cultures and contact histories were taken from all household and discoverable extra-household contacts, as defined, of known cases of pneumonia in the town and its immediate environs. These data were collected on 49 contacts of 8 cases of Type 1 pneumococcus pneumonia, and among these 49, 10 persons (20.4 per cent) were found infected with Type 1 on immediate or subsequent culture (Table 9). This group, while not strictly comparable,

TABLE 9

Incidence of Type 1 Pneumococcus Infection among Contacts of Known Type 1 Cases or Carriers and Individuals with No Known Contact According to Age Group and Type of Contact

| Age and Type of Contact | Number of Individuals ¹ | | | Number Positive For Type 1 Pneumococcus | | |
|----------------------------|------------------------------------|---------------------|------------------------|--|---------------------|------------------------|
| | Case Contacts | Carrier Contacts | No Contact Reported | Case Contacts | Carrier Contacts | No Contact Reported |
| Under 15 | | | | | | |
| Household | 10 | 14 | .. | 4 | 6 | .. |
| Extra Household | 7 | 8 | .. | 2 | 2 | .. |
| No Contact Reported | .. | .. | 48 | .. | .. | 9 ² |
| 15 and Over | | | | | | |
| Household | 16 | 27 | .. | 2 | 4 ³ | .. |
| Extra Household | 16 | 7 | .. | 2 | 1 | .. |
| No Contact Reported | .. | .. | 150 | .. | .. | 4 |
| Total | 49 | 56 | 198 | 10 | 13 | 13 |

¹ Three individuals had contact with both a case and a carrier, but each of them appears only once in this table, their position being determined by the nature of the contact known to have occurred first. On this basis, 2 are in the case contact group and 1 in the carrier contact group.

² This figure is comprised of 7 pneumococcus carriers and 2 primary cases which occurred during the course of the study in the random population sample. One carrier who gave a history of contact with one of these 7 but not with any of the primary carriers or cases is not included in the 9 positives but is in the total 48.

³ The third case of pneumococcus pneumonia occurring in the sample population appears here.

had a rate of contact infection no greater than that for Type 1 infection among the household and extra-household contacts of 11 known index Type 1 carriers. There were 56 contacts of these carriers among whom 13 (23.2 per cent) were found to be infected in the course of the culture surveys subsequent to their initial known contacts.

Both of these rates stand in sharp contrast to the incidence of Type 1 infection in the 198 members of the study population who had no known contact with either case or carrier of Type 1 and among whom 13 (6.6 per cent) became infected either as a case or carrier of this type. It is not presumed that this latter group was free of contact but it does seem reasonable to assume that the duration and intimacy of contact was probably much less than that in the other two groups. These findings tend to corroborate the view that the duration and intimacy of contact with infected persons is an important factor in the spread of pneumococcus infection.

The records of previous known pneumococcus pneumonia in Northville are unfortunately incomplete, but it is known that Type 1 pneumonia had occurred at least once in 1935 and twice in 1938. Pneumonia due to Types 3, 4, and 5 had also been reported during the 5 years prior to the study. In so far as can be determined, however, there had been no occurrence of any of these types beyond that consistent with their endemic levels.

It is unfortunate that no baseline study could be made of the blood antibody levels of the population prior to the onset of the high incidence of Type 1 pneumonia that occurred during the 1939-1940 season. However, if the general observations of Finland⁷ and the studies of Felton⁸ on 281 normal persons can be accepted as reasonably applicable to Northville, the levels of protective antibody found upon titration of the sera of 161 persons from the Northville study group (Table 10) indicate either that the population of Northville had previously had considerable exposure to Type 1 infection or that the infection was currently far more prevalent than suggested by the 9 per cent incidence rate for Type 1 pneumococcus in the sample population obtained by culture methods.

Of 161 individuals studied, 58 (36.0 per cent) showed protective antibodies in the blood at significant levels of 100 m.l.d. or greater. Forty-four (27.3 per cent) showed levels of 1,000 m.l.d. or greater, which suggests the likelihood of relatively recent type specific immunizing experience. Such a possibility seems plausible inasmuch as 2 cases of Type 1 pneumococcus pneumonia and 1 of Type 1 pneumococcus meningitis were known to have occurred just beyond the environs of the village, and 3 cases of Type 1 pneumonia had occurred within the village limits during the 6 weeks preceding the start of the survey.

One hundred and forty-five individuals were tested twice, the first

TABLE 10

*Protective Antibodies against Type 1 Pneumococcus as Encountered in Study Group and in Normal Group Reported by Felton**

| Group | Number Individuals Studied | Number Individuals with Protective Antibodies | | | Per cent of Total Studied | | |
|------------|----------------------------------|--|--------------------------|----------------------------|---------------------------|--------------------------|----------------------------|
| | | 10 m.l.d. or Greater | 100 m.l.d. or Greater | 1,000 m.l.d. or Greater | 10 m.l.d. or Greater | 100 m.l.d. or Greater | 1,000 m.l.d. or Greater |
| Felton | 281 | 43 | .. | .. | 15.3 | .... | .... |
| Northville | 161 | 76 | 58 | 44 | 47.2 | 36.0 | 27.3 |

* Felton, Lloyd D. *Public Health Reports*, 53:1855 (Oct. 21), 1938.

serological survey being made during the second culture survey and the second serological survey during the fourth culture survey. The trend of antibody level from the first survey to the second suggests that the basic level of exposure remained fairly constant during the study period (Table 11). Nineteen (13.1 per cent) of the sera

serological examinations. All of these had an antibody titer of 100 m.l.d. or more (Table 12). Of 48 individuals who had a history of contact with known Type 1 carriers or cases, 27 (56.3 per cent) had a titer of 10 m.l.d. or less, and 21 (43.8 per cent) 100 m.l.d. or more. All of these people had known exposure and it is reasonable to assume that many of

TABLE 11

Protective Type 1 Pneumococcus Antibodies According to Titer among Individuals Tested during Second and Fourth Culture Surveys

| Antibody Titer in m.l.d. at First Test | Number Tested Once Only | Number Tested Twice | Antibody Titer in m.l.d. at Second Test of Same Individuals | | | | | | |
|---|-------------------------------|------------------------|---|----|-------------------|-------------------|-------------------|------------------|-----------|
| | | | 0-1 | 10 | 100 | 1,000 | 10,000 | 100,000 | 1,000,000 |
| 0-1 | 11 | 84 ⁽²⁾ | 74 | 6 | .. | 1 ⁽¹⁾ | 2 ⁽¹⁾ | 1 | .. |
| 10 | 1 | 15 | 8 | 3 | 4 | .. | .. | .. | .. |
| 100 | 1 ⁽¹⁾ | 13 ⁽³⁾ | .. | 3 | 6 ⁽¹⁾ | 3 ⁽¹⁾ | 1 ⁽¹⁾ | .. | .. |
| 1,000 | 3 | 7 | .. | 1 | 4 | 2 | .. | .. | .. |
| 10,000 | .. | 19 ⁽⁴⁾ | .. | .. | 1 ⁽¹⁾ | 7 ⁽²⁾ | 10 ⁽¹⁾ | 1 | .. |
| 100,000 | .. | 5 ⁽²⁾ | .. | .. | .. | .. | 1 ⁽¹⁾ | 4 ⁽¹⁾ | .. |
| 1,000,000 | .. | 2 | .. | .. | .. | .. | .. | 1 | 1 |
| Total | 16 ⁽¹⁾ | 145 ⁽¹¹⁾ | 82 | 13 | 15 ⁽²⁾ | 13 ⁽⁴⁾ | 14 ⁽⁴⁾ | 7 ⁽¹⁾ | 1 |

NOTE: Figures in () indicate known carriers of Type 1 pneumococcus.

showed an increased titer, while 26 (17.9 per cent) showed a decrease. Among the 11 persons twice tested who were known to have or have had Type 1 pneumococcus infection, 4 increased and 4 decreased between the two surveys.

There were 12 known carriers and 2 cases of clinical Type 1 pneumonia among the 161 individuals who had

them became carriers at some time even though the infection was not demonstrated bacteriologically. This assumption is borne out by the considerable proportion (43.8 per cent) who had mouse protective antibody levels of 100 m.l.d. or more. In contrast to these are the 99 individuals who had no known contact with a source of infection. As previously stated it is not assumed that

TABLE 12

Relation of Antibody Level to History of Contact with Pneumococcus Infection

| Status of Individual | Total Individuals | Maximum Antibody Titer | | | |
|-------------------------|----------------------|------------------------|--------------------|-------------------|--------------------|
| | | Number of Individuals | | Per cent | |
| | | 10 m.l.d. or Less | 100 m.l.d. or More | 10 m.l.d. or Less | 100 m.l.d. or More |
| Cases or carriers | 14 | .. | 14 | .. | 100.0 |
| Known contact | 48 | 27 | 21 | 56.3 | 43.8 |
| No known contact | 99 | 76 | 23 | 76.8 | 23.2 |
| Total | 161 | 103 | 58 | 64.0 | 36.0 |

TABLE 13

Relation of Protective Type 1 Pneumococcus Antibodies to Known Pneumococcus Infection

| Maximum Titer in individuals in m.l.d. | Total Individuals Tested * | Number Having Known Pneumococcus Infection | | | Per cent of Total Infected | | |
|---|----------------------------------|---|--------|----------------------|----------------------------|--------|----------------------|
| | | Total | Type 1 | Other than Type 1 | Total Pos. | Type 1 | Other than Type 1 |
| 0-1 | 85 | 58 | .. | 58} | 61.6 | 0.0 | 70.4 |
| 10 | 18 | 11 | .. | 11} | | | |
| 100 | 14 | 11 | 2 | 9} | 38.4 | 100.0 | 29.6 |
| 1,000 | 14 | 10 | 2 | 8} | | | |
| 10,000 | 21 | 14 | 6 | 8} | | | |
| 100,000 | 7 | 6 | 4† | 2} | | | |
| 1,000,000 | 2 | 2 | .. | 2} | | | |
| Total | 161 | 112 | 14 | 98 | 100.0 | 100.0 | 100.0 |

* Highest titer when sera were obtained on both surveys.

† Two Type 1 cases are represented here.

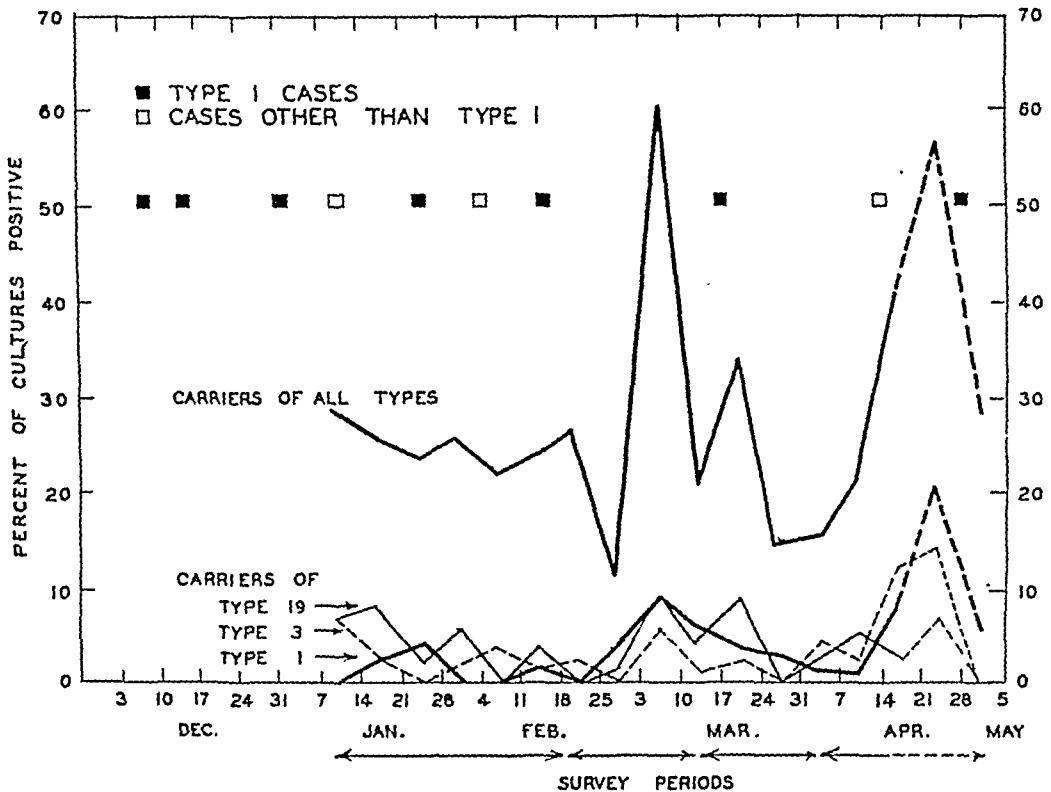
the members of this group did not have contact but it is assumed that their total contact experience was less than that of the so-called "known contact" group. The protective antibody levels among those without contact in which 76.8 per cent had only 10 m.l.d. or less are consistent with this view and it seems likely that had it been possible to have used a finer scale of antibody titration the contrast between the "known contact" and "no known contact" groups would have been greater.

There was little evidence that infection with a heterologous type of pneumococcus appreciably increases the antibody titer for Type 1 (Table 13). All individuals with Type 1 infection found upon culture showed a maximum protective Type 1 antibody titer of 100 m.l.d. or more whereas but 29.6 per cent of the persons found infected with types other than Type 1 showed maximum protective Type 1 antibody titers of 100 m.l.d. or more, and there is ample reason to believe that some of this latter group carried undetected Type 1 infection.

As has already been seen, no single pneumococcus type assumed preponderance at any time (Table 5 and Chart 1). Seven cases of pneumococcus pneumonia (3 Type 1; 1 mixed, Types 1

and 19; 2 Type 16; and 1 Type 7) occurred in the area during the study period (Table 1 and Chart 1). The ratio of cases of Type 1 pneumonia to known carriers of this microorganism was 1:8. Or, if we assume that a Type 1 antibody titer of 100 m.l.d. or greater constitutes evidence that the individual had been a case or carrier relatively recently, then the ratio of cases to these implicit and explicit carriers becomes 1:19. In previous studies of Type 1 pneumococcus distribution in rural areas at Treadwell³ and Schuyler Lake⁴ 2 cases were noted to 32 known carriers (a ratio of 1:16) during a 2 months period in the former area, while in the latter, which probably is not strictly comparable, there were 5 cases to 63 carriers (a ratio of 1:13) for the entire observation period of 14 months. The question of lack of comparability here resides in the possibility that there was selection of individuals for repeated culture on the basis of their known exposure, whereas the Northville data are based upon the results of the four surveys only. The fact that the figures involved are small in every instance, that the seasons and time intervals are not identical, and that one case more or less would make an appreciable difference in the case-to-carrier ratio seems to

CHART I
SHOWING DISTRIBUTION OF POSITIVE CULTURES AND THREE MOST COMMON TYPES BY WEEK OF CULTURE



provide sufficient basis for the relatively small differences in these 3 ratios. They constitute interesting refutation of the prevailing opinion, apparently unjustified, that there is a marked tendency for Type 1, 2, or 5 pneumococcus infection to incite pneumonia in a normally susceptible population rather than to remain harmlessly localized in the upper respiratory tract.

CONCLUSIONS

1. The spread of pneumococcus infection in a community, in so far as it is dependent on person-to-person contact, seems to be governed equally as much by contact with healthy carriers as by contact with the clinical disease.

2. Consideration of the case-to-carrier ratio in this and prior similar studies suggests that the so-called invasive types of the pneumo-

coccus, of which Type 1 is the prime example, are probably not as invasive as hitherto thought, and perhaps no more so than several other types less commonly encountered.

3. In the presence of an abnormal incidence of pneumococcus infection, large numbers of people may acquire type-specific antibodies at what may be assumed to be significant, and in some cases perhaps even protective, levels without having had any signs or symptoms of clinical disease.

4. The immunological data suggest that the culture methods in current usage do not give an accurate picture of the prevalence of pneumococcus infection in a given population group.

5. Further evidence appears in this study to favor the now generally accepted view that healthy carriers occur with appreciably greater frequency in the younger age groups. Whether this is due to actual differences in susceptibility at the different age levels, or to the gregarious peculiarities of the life

of the younger individuals could not be ascertained.

6. The apparently greater tendency of males to become carriers of pneumococci of all types as noted here has seldom been recorded previously in the literature. The numbers in the present study are too small for the figures to be conclusive, but should this difference prove to be a true one, it would be of particular interest in the light of the recognized greater incidence of clinical pneumococcal disease in males.

7. Although the occurrence of type-specific pneumococcus infection in a given population is a prerequisite to the spread of clinical pneumonia of the same type, the presence of such infection is not the sole determining factor in the selection of those individuals who develop the clinical disease. The probable significance of numerous other factors such as the virulence of the invading pneumococcus and variations in host resistance, is well recognized, but a true understanding of many of them is still wanting and knowledge of the manner in which they actually operate is relatively meager.

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NOTE: A study of this nature necessarily involves the coöperation and assistance of many persons. The authors are particularly grateful to the people of Northville for the manner of their reception, and to Dr. J. Edward Grant, Health Officer, Dr. K. André Durand, School physician, and Harold Boulton, Principal of the Northville Central School, which housed our laboratory and aided in innumerable ways.

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Improved Technic for Isolation of Dysentery Bacteria from Stools by Formaldehyde Inactivation of Bacteriophage

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DESPITE successive improvements of culture media, the laboratory diagnosis of bacillary dysentery remains unsatisfactory. Laboratory workers repeatedly fail to obtain cultures from stools of typical cases of clinical dysentery. The primary reason for this failure appears to be the age of the stool; stools cultured shortly after they are voided give better results than when culturing is delayed. A possible explanation of the extreme lability of the dysentery organisms is the presence of specific phage in the stool. The frequency of the presence of such phage has led Wheeler and Burgdorf (1941) to suggest its detection as a diagnostic procedure; this was not feasible because dysentery phage is often present also in normal stools. However, the fact that dysentery phage is of common occurrence in stools suggested that the rapid death of dysentery bacteria in stools was due to lysis. Assuming that to be the case, it would follow that an agent which would inactivate phage without injuring the bacterial cells should, when added to the stools, greatly increase the chances of isolating the causative organisms.

The work of Schultz and Gebhardt (1935) and of Kligler and Oleinik on the inactivation of phage by small doses

of formaldehyde indicated that this chemical might serve the purpose. The data presented below show that the simple procedure of adding to fresh stools a concentration of formaldehyde too low to injure the cells, but sufficient to inactivate phage, resulted in a considerable increase of positive cultures.

In preliminary experiments phage was added to stools artificially inoculated with shigella. In 6 hours the inoculated organisms could no longer be recovered. However, this killing effect was inhibited or prevented by the addition of an appropriate concentration of formaldehyde. The following is a typical experiment: 10 gm. of stool from a normal individual, proved not to contain phage, were emulsified in 10 ml. of saline and infected with 2 drops of a broth culture of Shiga dysentery bacteria. The stool was divided into two portions. To one part phage was added at the rate of 0.5 ml. of broth to each gm. of stool. To the other part no phage was added. Each sample of stool was then subdivided into equal parts and various concentrations of formaldehyde were added. Cultures were made immediately and 6 and 24 hours later; during the interval the stool samples were kept at room tem-

peratures. Cultures were made on MacConkey plates and suspicious colonies isolated and identified, in the usual manner. The results are summarized in Table 1.

TABLE 1

| | Cultures Made after (Hours) | | |
|---------------------------------|-----------------------------|---|----|
| | 0 | 6 | 24 |
| <i>Without phage</i> | | | |
| Infected stool | + | + | + |
| Infected stool and formaldehyde | | | |
| 1:20,000 | + | + | .. |
| 1:10,000 | + | + | .. |
| 1: 7,500 | + | — | .. |
| 1: 5,000 | + | — | .. |
| <i>With phage</i> | | | |
| Infected stool | + | — | — |
| Infected stool and formaldehyde | | | |
| 1:20,000 | + | — | .. |
| 1:10,000 | + | + | + |
| 1: 7,500 | + | + | + |
| 1: 5,000 | + | + | — |

Both Flexner and Shiga organisms survive in phage-free stools for 24 hours. Formalin in a concentration of 1:7,500 kills the organism in 6 hours. Lower concentrations have no effect. When phage alone was added dysentery organisms could no longer be recovered after 6 hours, but when phage and formaldehyde were added cultures were positive after 24 hours even in a formalin concentration of 1:7,500, presumably because part of the formalin was bound by phage.

A second type of experiment was made with dysentery stools. These fresh stools were diluted and bacterial counts made. To one portion, 1:10,000 formalin was added, the stools were kept 24 hours at room temperature, and again diluted and cultured. The counts of the two sets of plates showed practically the same number of organisms; in one fresh stool the number of Shiga bacteria was 173×10^4 , and when plated after 24 hours with formalin the count was 170×10^4 . The concentration of formalin used had no lethal effect on

the dysentery or other bacteria present in the stools.

The procedure was then applied to dysenteric stools sent to the laboratory for diagnosis. Only fresh stools were used in these tests. Immediately on collection they were tested for the presence of phage and divided into three parts. One part was kept as control, and to the others formalin in concentrations of 1:10,000 and 1:7,500, respectively, was added. The various samples were plated promptly on MacConkey, and again after being 6 hours and 24 hours in the laboratory.

Of the 63 fresh stools examined 47 were positive for dysentery—Flexner or Shiga. All the positive stools contained also dysentery bacteriophage. Of the untreated stools recultured after 6 and 24 hours, only 14 still yielded dysentery bacteria. Of the 63 stools treated with formaldehyde and cultured after 6 and 24 hours, 49 were positive.

Thus the formaldehyde treatment gave a higher percentage of positive stools and the stools remained positive 6 and 24 hours after they were brought to the laboratory. Because of the different consistencies of stools it was found desirable to use two formalin concentrations; when there was much blood in the stool the higher concentration gave better results.

SUMMARY

Dysentery phage is probably responsible for the rapid death of dysentery bacteria in stools brought to the laboratory for diagnostic purposes. Hence stools kept for some time before culturing give negative findings. This handicap is removed by the addition of concentrations of formalin (1:10,000 and 1:7,500) which inactivate the phage but are not lethal for the bacteria. Of 63 dysenteric stools cultured almost immediately after they were voided, 47 yielded Flexner or Shiga bacteria; cultured 6 hours later only

14 were positive. However, when the formalin was added to portions of these stools in concentrations of 1:10,000 and 1:7,500, respectively, 49 of the stools gave positive cultures after standing 6 and 24 hours respectively in the laboratory. This procedure should enhance the efficacy of laboratory diag-

nosis of dysentery, and under field conditions should increase the success in detecting acute and carrier conditions.

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Completeness of Birth Registration in the United States in 1940

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AS many of you know, during the 1940 Census a special effort was made to test the completeness of birth registration in the United States. This test was the first conducted simultaneously for every state in the country. The plans for the test have been discussed before groups of registrars of vital statistics several times and no doubt many of you know very well the procedures that have been used in the test during the past two years. However, for the benefit of those who are not familiar with the major elements of the test, I should like to review it and indicate the results.

A test of the completeness of birth registration has many values. First, it is an indication of the efficiency of the state registration mechanism. Second, the figures resulting from such a test are of considerable value in the analysis and use of birth statistics, both for interpreting the birth rates published annually and for estimating populations. Third, a test of the completeness of birth registration indicates what proportion of the children born in a given year is missed entirely in registration of births so that there is no official record of their citizenship, age, or parentage. The importance of birth registration completeness has been pointed up considerably during the past year by the overwhelming increase in requests to state offices for certified copies of birth certificates and the flood of applications for delayed registration by

persons whose births were not registered.

The 1940 test is based on a list of children born during December, 1939, January, February, and March, 1940, who were enumerated on "infant cards" by census enumerators. These cards contained certain information not available on the regular population schedules, such as exact date of birth, exact place of birth, maiden name of mother, and hospital of birth. To match against this list of children, special copies of birth certificates were obtained from each state bureau of vital statistics for all children born during the same four months. In addition, a special copy of the death certificate was secured for each child born during the four months of the test period who died during these same four months. The object of the test was to match the birth records with the infant cards and the death transcripts to determine what proportion of the children enumerated in the Census was actually registered.

All these records were sent to Washington, where, with the help of a WPA project, the preliminary processing of the records was carried out. The first step was to arrange the infant cards, birth transcripts, and death transcripts by state of birth. This meant, for the infant cards and the death transcripts, a reallocation from the state of residence at the time of the Census, and from the state of death, to the state of birth. When this was accomplished, all three sets of records had been

placed on a comparable basis by state of birth.

The second step was to alphabetize all three sets of records by surname of child. This was by far the most time-consuming portion of the test and took many months to complete effectively.

The third step involved matching infant cards and death transcripts with birth transcripts. This part of the procedure was carried out very carefully. Objective standards for matching were established before this phase of the work was begun. When the matching for a state was completed, every set of matched records was verified by a specially trained clerk to see that the standards had been maintained. By this means, we believe that the results of the test have been kept strictly comparable for every state. When the matching was completed, about 75 per cent of the records eventually matched for each state had been placed together.

The fourth step comprised the writing of 162,000 form letters, chiefly to parents, in an effort to clarify or complete the data on the remaining unmatched infant cards. The letter requested the parents to send to the Bureau of the Census certain data on their child, such as the name of the child, place and date of birth, maiden name of mother, name of father, and the name and address of attendant at birth. The replies represented an unusually high percentage of letters returned compared to the number mailed. By writing follow-up letters and letters to hospitals when no answer was received from the parents, it was possible to obtain data for about 80 per cent of the children whose birth certificates could not be located. The information given in the letters served as an accurate check on the names, places, and dates of birth of the children given on the infant cards. In many cases it was possible to go back to the files of unmatched birth transcripts with the

new information obtained from the letters and find the birth transcripts for the children in question. On the other hand, if, after receiving a letter with full information, a birth transcript could not be located, it was clear that no birth record was available for that child in the file of special copies of birth certificates.

Another type of information gathered by the letters was a statement of date of birth, which indicated whether a given child was born within the four months of the test period, before the test period, or after it. With a verification of this fact from the parents or hospital of birth, it was possible to eliminate from further consideration in the test all infant cards representing births occurring before or after the test period.

The fifth step in the procedure was the tabulation of the results of the work in the Bureau of the Census. The percentage results are shown in the first column of Table 1. The asterisks indicate states which have a special problem due to race. When it is possible to do so at a later date, a race breakdown will be given for these states so that more detailed analysis of the significance of the figures may be made.

The sixth step was to take the unmatched letters from parents and copies of the unmatched infant cards and death transcripts, for which no letters had been received, to state bureaus of vital statistics for a final check in the original files. There were several reasons for this. First, there are certain limitations in matching when relatively untrained clerks match a set of records covering the entire country. The trained personnel of a state office becomes extremely proficient at locating particular records. Such clerks become familiar with unusual names and their variations in a way that newly trained personnel do not. Second, when the birth transcripts for the test were forwarded to

TABLE 1

*The Percentage of the Completeness of Birth Registration in the United States by State:
December, 1939, through March, 1940*

| <i>Area</i> | <i>Percentage Shown after Check within Bureau of the Census</i> | <i>Percentage Shown after Check within State Bureaus of Vital Statistics</i> | <i>Final Percentage</i> |
|----------------------|---|--|-----------------------------|
| UNITED STATES | | | 92.5 |
| Alabama * | 80.0 | 84.2 | 85.2 |
| Arizona * | 71.9 | 83.5 | 84.4 |
| Arkansas * | 67.3 | 74.1 | 75.9 |
| California | 93.8 | 97.6 | 98.0 |
| Colorado | 82.2 | 87.9 | 89.8 |
| Connecticut | 94.4 | .... | 99.4 |
| Delaware | 91.4 | 96.5 | 97.4 |
| District of Columbia | 91.1 | 97.3 | 97.9 |
| Florida * | 81.9 | 89.0 | 89.9 |
| Georgia * | 76.8 | 80.1 | 81.3 |
| Idaho | 90.1 | 93.9 | 95.0 |
| Illinois | 93.7 | .... | 95.0 |
| Indiana | 93.0 | 96.0 | 96.5 |
| Iowa | 84.8 | 94.1 | 94.6 |
| Kansas | 92.6 | 94.9 | 95.5 |
| Kentucky * | 83.3 | 86.7 | 89.2 |
| Louisiana * | 80.8 | 85.4 | 86.1 |
| Maine | 95.1 | 95.7 | 96.1 |
| Maryland | 90.7 | .... | 97.1 |
| Massachusetts | .... | .... | 98.9 |
| Michigan | 96.7 | .... | 97.8 |
| Minnesota | 97.1 | 98.8 | 99.3 |
| Mississippi * | 81.8 | 88.6 | 89.8 |
| Missouri | 82.2 | 87.8 | 90.2 |
| Montana | 92.7 | 97.2 | 97.6 |
| Nebraska | 95.5 | 96.5 | 96.9 |
| Nevada | 87.1 | 94.4 | 96.2 |
| New Hampshire | 91.1 | 98.6 | 98.7 |
| New Jersey | 93.7 | .... | 99.0 |
| New Mexico * | 62.6 | 81.4 | 86.4 |
| New York | 94.0 | .... | 98.9 |
| North Carolina * | 83.2 | 84.6 | 86.1 |
| North Dakota | 90.1 | 93.4 | 94.7 |
| Ohio | 91.8 | .... | 95.2 |
| Oklahoma * | 80.1 | 84.7 | 84.8 |
| Oregon | 92.6 | 96.5 | 97.1 |
| Pennsylvania | 92.2 | .... | 97.0 |
| Rhode Island | 97.7 | 98.8 | 98.8 |
| South Carolina * | 70.5 | 76.4 | 77.6 |
| South Dakota | 91.5 | 94.9 | 95.4 |
| Tennessee * | 71.3 | 78.8 | 80.4 |
| Texas * | 80.9 | .... | 86.5 |
| Utah | 92.8 | 96.6 | 96.6 |
| Vermont | 95.1 | 97.2 | 97.3 |
| Virginia * | 85.3 | 89.4 | 91.9 |
| Washington | 92.3 | 97.1 | 97.8 |
| West Virginia | 80.7 | 83.7 | 86.5 |
| Wisconsin | 95.7 | .... | 96.9 |
| Wyoming | 90.2 | 92.2 | 95.6 |

* These states have a special registration problem due to race. Tabulations including a race breakdown will be available at a later date.

the Bureau of the Census, they were generally made only for those children born during the current month whose births were registered on time. Transcripts of certificates filed later often were not included among those sent to the Bureau of the Census. The process of transcription for the test was a special job and in many states certificates

filed late were difficult to locate. As a result, when the matching in Washington was completed, the records for a number of children were actually on file in state offices but were not available for searching in Washington.

The Bureau of the Census was able to send a field agent to almost every state to assist the state registrar in

making a thorough check against his state files. In all states where indexes to the filed records were available, a search was made first through the index, then, if it seemed desirable, a further check was made through the individual certificates to locate any additional records which might not be indexed. Also attempts were made in each state to check adoption files, records from foundling homes and other similar institutions, to determine whether a child for whom an infant card or death transcript had been made was actually registered under another name due to adoption or some other reason. In those states where indexes were not available, it was necessary to do all searching through the original records after sorting the infant cards and the death certificates into an order similar to the filed birth certificates. The matched records were returned to the Bureau of the Census. The unmatched records were left in the state for a further check in the field.

After the matched records were returned to Washington, a further tabulation was made, showing the results of the state office checks. The percentage results are shown in the second column of Table 1. It may be seen that the percentages of completeness of registration for all states are somewhat higher as a result of the state office checks. These are not the final figures of the test. Further modifications were effected by the field checks conducted by each state bureau of vital statistics.

At the time of the check in state bureaus of vital statistics, it was necessary to settle the question of including in the test birth certificates filed late. It was essential to choose a date after which no birth records could be accepted for the test, for it is perfectly obvious that delayed records of birth will continue to be filed for an indefinite period after birth. It was therefore decided that birth certificates filed

after July 31, 1940, would not be included in the test. This date was chosen as a reasonable one, first, because it was assumed that four months after the close of the test period would provide adequate time to secure late birth registrations for the test. Second, as the work on the test progressed and letters were written to parents, it became apparent that these letters were a strong stimulus in effecting greater completeness of birth registration. After receiving letters in which some doubt was expressed as to whether their children's births had been registered, many parents investigated and caused the certificates to be placed on file. If a deadline for receipt of transcripts of delayed birth certificates had not been set at a date prior to the time the letters were sent out, a considerable bias in the test would have resulted.

We requested that the date of filing be shown on each birth transcript forwarded to the Bureau of the Census after the state check. All those birth transcripts filed after July 31, 1940, were not counted in the test as registered births.

The seventh step in the test was the final verification and checking on each child for whom an infant card or death transcript was available but for whom no birth transcript could be located. It was proposed that local health authorities in each state attempt to locate these children to determine, first, whether the child exists, and second, why his birth was not registered. Every state conducted such a program. It raised the percentages of completeness of birth registration from 1 to 3 per cent. In cases where a letter was received from the parents giving the requested information, it was not necessary for purposes of the test actually to locate the child or do further work in the field. It is desirable, however, that the births of these children be registered as soon as possible.

An eighth step was carried out when the unmatched records, which were checked in the field by state bureaus of vital statistics, were returned to Washington. This step was a final nation-wide matching of the remaining unmatched infant cards and death transcripts against the remaining birth transcripts. This check was followed in order to eliminate, as far as possible, major errors in place of birth given on the infant cards and death transcripts. With this step completed, the essential "checking" features of the test were finished and the final tabulations were made. The final percentages are given in the third column of Table 1.

There are probably several questions in your minds about the test which I have not yet discussed: First, by what formula were the percentages of completeness computed? Second, what will happen to states whose completeness of birth registration is less than 90 per cent?

The current formula used for computing the completeness of birth registration is the same as that used by the Bureau of the Census in past tests. It is assumed that the infant cards and death transcripts, against which the birth transcripts are checked, are a representative sample of the children under 4 months of age at the time of the test. The proportion of the infant cards and death transcripts for which birth transcripts can be located, therefore, is assumed to be the true percentage of the completeness of birth registration. In other words, the formula is "the total number of birth transcripts matched with infant cards and death transcripts divided by the total number of infant cards and death transcripts received for the test." This formula is exactly the same as that traditionally used by the Bureau of the Census. It seems to be the most satisfactory method of computing the completeness of birth registration.

According to original standards, a state had to demonstrate that its registration of births was 90 per cent complete before it was eligible for admission to the birth registration area set up by the Bureau of the Census. The policy of the Census Bureau stated in 1936 still stands. At that time William Lane Austin, Director of the Census, said: "The Bureau must continue to make tests to check the completeness of registration, but the object of such checks hereafter will be to help the state with its problems of registration rather than to threaten its removal from the registration area."

State health officers and state registrars are to be congratulated on their active and effective coöperation in making possible this test of birth registration at a time when many normal activities have had to be curtailed or even dropped temporarily because of the national emergency. The special job of transcribing birth and death records for this test was an added burden. The checking in state offices was often done under great difficulty, many times with night shifts and Sunday and holiday work. It was only by sacrifice on the part of the personnel of state health offices that the fine results of this test were possible. To them goes a major share of the credit for this first nation-wide test of the completeness of birth registration.

Final results of the test reveal that in 1940 birth registration for the entire country was 92.5 per cent complete. This means, however, that even after 25 years of birth registration, in 1940 almost 200,000 babies in the United States were not registered! This is indeed a severe indictment of the entire registration system. It is particularly serious at present when millions of adults are searching frantically for every shred of evidence to prove beyond question their age, parentage, and citizenship. Special provisions are being

made to place on file delayed birth records for these people, born before the present widespread and systematic registration of births was established.

The children of 1940 who 20 years from today cannot produce satisfactory birth records will lose even more than their parents. Each step we take toward the goal of social and economic security

for everyone makes more precious each individual's proof of his rights to such benefits. It is the responsibility of the state registrars, the state health departments, and the Bureau of the Census as well, to see that 100 per cent of our children are registered at birth. We must assure today's children their birthrights tomorrow!

Organizing a Large Community for Health Education*

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ORGANIZING a community for health education is part of the democratic process. The people of America rule themselves. They are individuals desirous and capable of standing on their own feet. The health department should help the community to understand its health problems and aid in their solution.

Health education provides a way in which every individual in the community may be enlisted to carry on a part of the health program. By providing an opportunity for them to express opinions, to find and solve problems, by allowing people to help themselves, the health education program is observing our most cherished fundamentals of democracy.

This concept of health education does not agree that a publicity campaign is an adequate program. Publicity, planned and executed by professional workers, is limited in its effect because it is passively received. It is learning and not teaching which is important in education. Without participation, there can be and will be little if any learning. Fanfare may be ignored or quickly forgotten, but hours spent in discussing the problem, in planning, in executing plans cannot help but leave some impression upon the mind of the individual.

There are, of course, many problems associated with organizing the people of any city, large or small, in a health education program based on these principles. I shall discuss what we are doing in Boston as an example of health education.

The first problem which confronted us was the question of unit areas. Should the program be built for the entire city as a unit or should it be organized in separate districts? For many reasons we favored a district or sectional organization bound together by unified administrative policy. No city of a million people has a single set of characteristics. It is, rather, a group of small communities, separate in racial origins, tastes, economic status, and even languages. The greatest number of social groups which will participate actively in the programs are limited in their membership to small sections. Even nation-wide fraternal and labor organizations have their membership separated into posts or locals. Problems, too, differ widely. Tuberculosis may be widespread in one section and all but absent in another. Time and effort would be wasted in urging the people of a section to solve a problem that was nonexistent in that section.

As community organization was to be the responsibility of health educators, it was thought best to limit the activities of each worker to a sufficiently restricted area to enable her to become thoroughly acquainted. The worker should be a person known in the dis-

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trict, both to the residents and to the other professional workers in the schools, libraries, and social agencies. She should have the opportunity for careful study of the characteristics and the idiosyncracies of her section and for becoming familiar with the facilities afforded by the district which may be valuable in the conduct of her program.

One section of the city was first selected for organization according to this plan in order to work out the basic policy which must guide the entire health education program. In this district a preliminary study was made. Vital statistics were analyzed in order to ascertain what the more pressing health problems were. Lists of professional workers, social clubs, schools, settlement houses, physicians, and dentists were compiled. The peculiarities of the district were analyzed. After the educator had thoroughly familiarized herself with these data, it was possible to begin actual organization of the district.

In Boston, the Health Department is decentralized, each of eight sections having a Health Unit. The educator was given an office in the Unit in her district so that it would be easy for the people working with her to come together for meetings and consultations. The Unit is well equipped for such meetings, having a large auditorium and several smaller rooms for conference work.

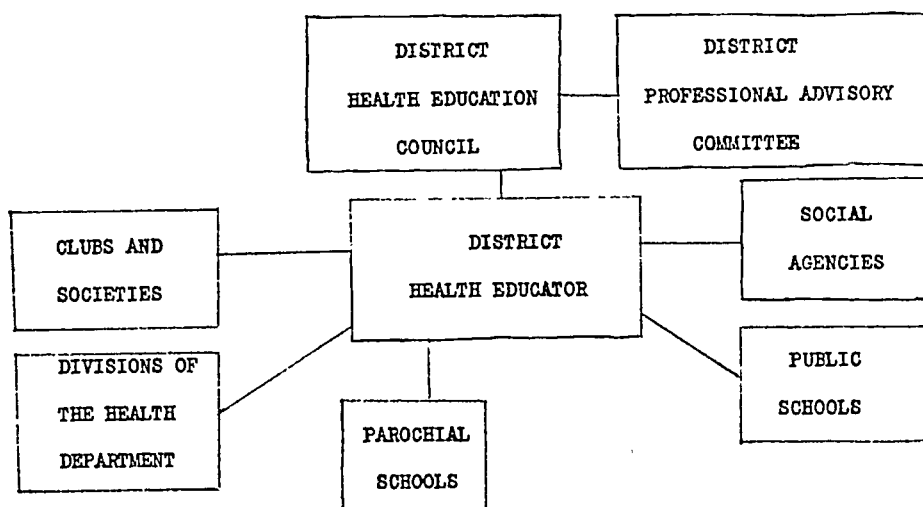
Since much health education and service begins with the private physician and dentist, the educator invited them to a meeting where the aims and policies governing the program were explained. The 30 physicians and 12 dentists were invited by personal visit. A separate meeting was held for each group. At these meetings, they were asked to select a committee of three to represent them in conference with the other groups. In much the same way, other professional workers were ap-

proached and the aims of the program were explained. These groups included the churches of all denominations, both the public and the parochial schools, the settlement houses, the Community Health Organization, visiting nurse agency, and the library.

Up to this point the program had concerned itself only with professional workers. The educator had, however, in her conversations with these workers, learned the names of many individuals living in the district who might be termed "key people." One of these accepted the chairmanship of the district committee or council. Through several conferences between the chairman, the district health educator, and the administrative consultant for the program, Professor Clair E. Turner, other residents of the community were selected to be members of the committee. In order that these lay people who were taking part in the program would not feel overwhelmed by the weight of the professional group, it was thought best to have two committees, one professional and one lay. The two were bound together by the health educator who served as secretary of each and by the chairman of the lay committee who also served as chairman of the professional committee.

The lay committee met each week. The first meeting permitted them to get acquainted with each other and with the aims of the program. They liked the idea of having an opportunity to improve their district. The section has a relatively low economic status and many of the people are employed in the large market area adjacent to it. Parts of the section enclose week-end street markets.

The committee members were frank in their evaluation of their section, and were not reluctant to acknowledge the presence of many health needs. Since it was agreed that only one major problem should be considered at a time,

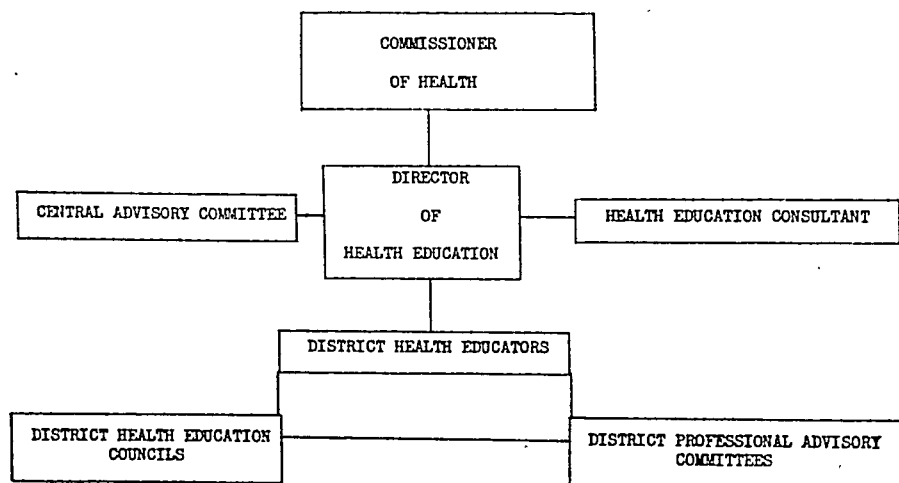
ORGANIZATION OF A DISTRICT FOR HEALTH EDUCATION

they were anxious to select the most pressing need.

The survey method was adopted. Using materials provided by the educator, each member analyzed a given area. These reports were discussed at an open meeting and the problem was selected. The health educator is able to guide the committee to some extent

in its selection since she has the information which enables her to explain needs and problems to her group.

The first problem this group elected to solve was that of rat control. Time does not permit a long description of the activities carried out by the committee concerning this problem. In the course of the months during which this

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question was their main concern, they held an open house at the Health Unit, explaining rat control by means of exhibits, movies, and speakers. They helped the educator work out a leaflet and a poster which were printed and distributed. Exhibits were placed in store windows, libraries, and settlement houses. The health educator provided a teaching unit for each teacher in the sixth, seventh, eighth, and ninth grades. Many excellent pieces of pupil work attest to the efficacy of this phase of the program. The children also attended illustrated lectures and movies which the educator provided at school assemblies.

Other divisions of the Health Department coöperated with the program. The nurses distributed fliers announcing public meetings to the people with whom they came into contact. The sanitary inspectors gave advice on rat control. The food inspectors urged all food handlers to take proper steps to rat proof storerooms containing supplies.

After the program was under way, the need was felt to reach every person in the district. The committee members were willing to visit every home but considered themselves inadequate to render expert advice on this subject, even though they had familiarized themselves with all the available literature. The sanitary division of the Health Department was asked to help, and two rat control experts were placed at the service of the committee. It was decided to make a sample survey of a typical block in the district, tabulating the findings of rat infestation and giving rat control advice to every landlord and tenant. Each house and every apartment was to be visited. Survey forms were prepared under the guidance of the consultant in sanitation, Professor Murray P. Horwood. The Division of Predator Control of the U. S. Department of the Interior helped both in the preparation of the survey cards

and in the sample survey. A definite procedure was agreed upon for the uniform recording of findings.

The results of the sample block survey were so convincing that it was decided to survey the entire district. This work is still continuing. The people of the district were anxious to have the survey extended to all parts of the section and urged the committee to have the Health Department inspectors reach their homes. The committee members advised the people of a block that the inspectors would visit them the next week. In this way the inspectors, coming by invitation, are then expected and find all the people very coöperative. The resident accompanies the inspector on his survey so that he may learn what evidences there are of rat infestation and ways of overcoming the rodent. Literature is left with each person. In this way, the survey has become a people's project and involves true education rather than merely survey statistics.

This description of some of the activities of the committee, illustrates the way in which all the facilities of the district are concentrated on a single problem. Unlike short campaigns, this type of program has the advantage of continuity. Children and adults alike are frequently reminded of their part in solving a community problem. There has not been one instance in which co-operation was refused. Some people are more active than others, but that is to be expected.

The problem is by no means solved as yet. Rat control is too big a problem with too many ramifications beyond the control of the individual to be entirely solved in a few months. The program has, however, awakened the people to the recognition of the existence of the problem. They now know the dangers of a large rat population. They know what rats cost the community. They are now beginning to do something about rat control and they have

the information they need to work intelligently.

There is another important feature of our district education organization. It became apparent that unless a large number of the residents felt themselves a part of the program, the committee would resolve itself into just another group in a district thickly studded with social organizations of various kinds. To avoid this possibility, it was decided to form the North End Health League, with individual members who were residents of the district, and group members consisting of clubs, societies, and labor organizations. The lay committee was to be the executive group, calling itself the North End Health Council. Each club joining the League was to have the privilege of sending a representative to the council. The members of the original committee undertook this task of securing group members. The list of social groups was carefully checked and clubs purely political in set-up were eliminated. About twenty-five organizations were invited to join, most of which did so immediately. In this way, such groups as the American Legion posts, the Veterans of Foreign Wars, and many others became members of the council. Their club meetings now became ready-made audiences for the program. There is no need to try to gather an audience, since the total membership of these clubs includes practically every adult in the entire district.

I have described the organization of a single district in fairly complete detail, since it illustrates the principles employed by the health education program. We have a city-wide advisory committee of experts from other organizations, which discusses all plans with the consultant and the health educators. In this way, we have the benefit of their advice and avoid conflict with other programs. Very often valuable assistance is obtained. One of the

representatives of the advisory committee, for example, is the head of our Community Health Association which provides the visiting nurses in our city. These nurses are very coöperative and help wherever possible. Their support of the program, permits a multiplicity of approaches that makes for good education. This type of coöperation also permits an impartial evaluation of the work accomplished and does away with many pitfalls that otherwise might not be avoided.

As a health officer, I am particularly enthusiastic about the benefits of a health education program. Since the educators work in close contact with the residents of the community, they can help in interpreting the work of the other divisions of the Health Department. They form a contact between the people and the technical workers of the department. By interpreting the purposes and services of the Health Department, they make the residents of the city far more receptive to its work.

Since February 1, 1943, the services of five health educators as well as the continued consultant service of Dr. Turner have been available to extend this program on a city-wide scale. The Health Department has always had the complete responsibility for health work throughout the parochial school system. A new curriculum in health education has been completed by the Director of our Health Education Service, working with committees from the Health Department and the office of the Diocesan Director, for use in these schools. The district health educators are also acceptable to the public school system, since they hold the degree of Master in Education as well as the Certificate in Public Health in the field of health education. This makes possible the simultaneous development of school health education and adult education as illustrated by the

rat control program in the North End.

There are, of course, certain city-wide activities of public health education such as printed matter, newspaper articles, radio exhibits, and in-service training of personnel. These are an important part of health education, but I believe a health education program which consists only of these activities is far from adequate. The essence of good health education in a large community, as I see it, is the organization of key people and social groups in the

various sections of the city to find and to help solve their health problems. With such a program, the health department can really become the appreciated servant of the people instead of a policing agency. This recognition and appreciation of the value of a strong and well equipped health department is reflected by active support for new programs and adequate working funds. A health education division, staffed by well trained workers, is an essential part of any public health department.

Development and Management of a Cotton Rat Colony*

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FOLLOWING the announcement made by Armstrong¹ that poliomyelitis virus could be transmitted to cotton rats, the Michigan Department of Health Bureau of Laboratories obtained wild stocks² of *Sigmondon hispidus hispidus* (Figure 1) from Florida and South Carolina, and of *Sigmondon hispidus littoralis* from Florida and Georgia, and has attempted to raise them in captivity.†

Approximately 500 trapped wild rats were the foundation of the colony which was started November, 1939. Subsequent to September, 1940, 7,800 young have been produced from this colony which has averaged about 180 pairs of breeders. At the present time the colony is composed of 250 pairs of breeders which produce about 700 young per month.

EQUIPMENT

A cotton rat colony can be housed in any quarters suitable for the raising of small animals. However, it has been found necessary to design and build a special cage 20" x 10" x 10" for breeding purposes (Figure 2). The cage, constructed of sheet iron and screen, and coated with aluminum paint, has

an enclosed nesting compartment with a removable "Masonite" bottom. The exercising and feeding compartment has screen sides and removable screen bottom. A tray containing wood shavings slides under both compartments. The breeding cages are grouped in units of 25 on movable iron racks.

Young animals following weaning, and animals ready for test, are kept in small animal cages (Figure 3) which are mounted on rubber tired trucks in batteries of four.

WORK SCHEDULE

In maintaining the cotton rat colony the following duties are carried out routinely:

1. Daily: Water and inspect all members of the colony, recording births and deaths.
2. Three times a week: Feed all members of the colony.
3. Weekly: Wean all 3 week old rats, discard nonbreeders, pair new stock, and clean all cages.
4. Monthly. Wash and sterilize all cages and drinking bottles.

FEED

From the great variety of foods which have been offered to the cotton rats, the following diet has been adopted because the rats have eaten it readily, have apparently thrived, and have reproduced satisfactorily.

1. A mixture of 1 part sunflower seed and 3 parts of rolled or whole oats.
2. Equal parts of commercially prepared fox and mouse pellets.

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 30, 1942.

† Aided by grant from the National Foundation for Infantile Paralysis, Incorporated, and the Works Project Administration.

3. Fresh apples, carrots, tomatoes or alfalfa cuttings.

4. Water (from glass bottles equipped with hanging drop dispenser).

MANAGEMENT OF BREEDERS

Six week old cotton rats of healthy and sturdy stock are selected for breeders, and are permanently marked by a system of ear and toe markings. At the time of pairing, a breeding record is compiled for each male and female. This record includes information regarding sex, generation from wild stock, identification number, date of birth, and production record.

Under the present system of management, matings of a male and a female are permanent except in certain instances when it is found possible to rotate one male among several females.

Male and female rats from 6 to 7 weeks of age are sexually mature and are ready to be paired. In studying vaginal smears from a limited number of females, it has been found that the estrous cycle is irregular, varying from 4 to 8 days, with an average of 5.7 days. The period of gestation varies from 26 to 28 days. The average number per litter is 5, with 11 the maximum that has been encountered. Newly born animals have averaged 7 grams in weight and are well haired out at birth. They have begun to run around the cage at an early age, have eaten solid food within about 1 week, and have been ready to be weaned at 3 weeks of age.

The average production span of a female cotton rat is not known. The

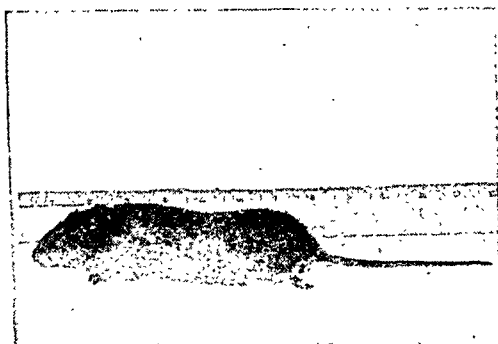


FIGURE 1—Female cotton rat, 1 year old

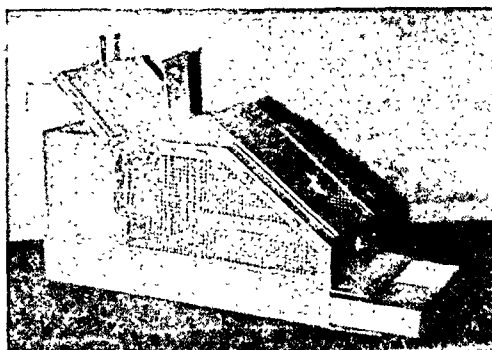


FIGURE 2—Cage used for breeding

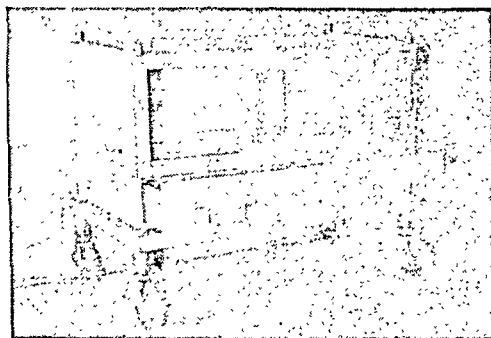


FIGURE 3—Cage used for weaned stock and animals ready for test

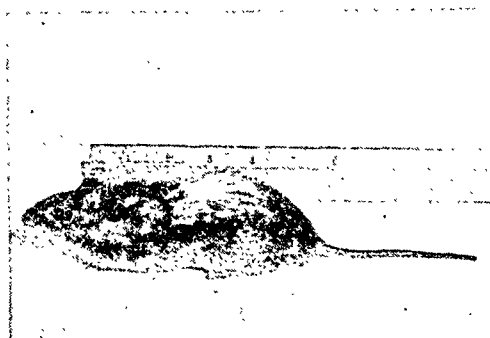


FIGURE 4—Male cotton rat, 6 months old, affected with alopecia

oldest rat in the colony that is still producing is 20 months old. This is a 2nd generation female which has a record of 70 births in 13 litters.

Precautions must be taken in the handling of cotton rats and it is advisable not to disturb the newly born rats. The 8th generation rats, born in the colony, are as nervous and likely to bite as are rats when first trapped. Heavy cowhide gloves must be worn when handling rats 2 weeks or more of age. The animal should be grasped firmly at the nape of the neck, as handling the rat by its tail usually results in stripping off the skin.

Through a system of close inbreeding, it may be possible to produce a specific type of cotton rat which would be more uniformly susceptible to viruses. From a group of 10 brother and sister matings, three pairs were selected to be used as the basis of three pure strains of animals. One strain which showed evidence of lighter hair coloration has produced 4th generation rats of sturdy stock.

LOSSES AMONG COTTON RATS

Losses among cotton rats have been mainly due to three factors: mechanical injuries which have resulted from fighting among mature animals or from improper handling by attendants; sacrifice of rats in an effort to eliminate and control alopecia; and a small percentage loss from possible bacterial infection, internal parasitism, or starvation.

1. Among total deaths in breeding stock 45 per cent have been due to fighting. The loss has been roughly 60 per cent among males and 40 per cent among females subsequent to their pairing or parturition. This loss of breeding stock has been materially reduced by washing each member of the pair with a 1 per cent pine oil or coal tar disinfectant solution in order to destroy their natural odor. A small unknown percentage of animals die as a result

of injury during handling or have had to be killed because of severe injury inflicted by cage mates.

2. A number of rats have been sacrificed in an effort to eliminate and control alopecia, or loss of hair, which has occurred in rats of both species and of all ages. Subsequent to its discovery over 400 rats have been affected to varying degrees by this condition. Alopecia is usually first noticed in the dorsal-lumbar region where the loss of brown-tipped guard hairs results in exposure of the dark underfur. In advanced stages the back becomes almost denuded of hair (Figure 4) and the area eventually extends forward to the head region. The condition has also been exhibited in other specific regions such as around the eyes, on the forehead, and at the base of the tail.

The cause of alopecia is uncertain. Ringworm spores have been found in the shafts of hair taken from affected areas, but they may not be the primary cause of the condition. No animal has ever lost weight or died as a result of the condition.

3. Losses due to bacterial infections, internal parasitism, or starvation have been small. Bacteriological examinations made on rats that died of unknown causes have revealed the presence of a variety of bacteria including green producing streptococci, staphylococci, and organisms of the *Proteus* group. Cotton rats evidently are not very susceptible to organisms of the *Salmonella* group since the colony, for the past year, has been housed with a colony of mice where *Salmonella* infections have been present. Furthermore, cotton rats experimentally have resisted artificial oral exposure to *Salmonella* organisms.

Internal parasites have been recovered from trapped wild animals which died during or soon after shipment. Of 170 wild animals thus examined 49 were found to be infested with either tapeworms, roundworms, echinococci, or

microfilaria. Fleas and lice also were found on the wild stock. No parasites of any type have been found in any of the animals that have been raised in the colony.

Cotton rats apparently are not very hardy and easily die as a result of moderate starvation. In cages where large numbers of rats are kept the food supply occasionally becomes low over week-ends, the rats become weak, refuse to eat, and some of them die.

A loss of 9 per cent has been observed among young animals prior to weaning. The exact cause of this fatality is unknown. Deaths following premature births have been recorded

and some adults have killed their young soon after birth.

SUMMARY

The development and maintenance of a cotton rat colony for use in poliomyelitis research by the Michigan Department of Health, Bureau of Laboratories, has been presented. By careful management, cotton rats can be successfully raised in captivity.

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The Opportunity for the Engineer in the Field of Housing*

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SIXTY years ago little was known as to the factors required to produce a safe and potable water supply. Today, through laboratory research and controlled field experience, the sanitary engineer has the tools to diagnose and prescribe for almost any specific water supply problem.

The objective, however, will not have been realized until safe potable water reaches the consumer in the home and the waste is returned to some point for safe disposal. The real property inventory surveys¹ made in 1934-1936 indicate that 15 per cent of all families living in cities in the southwestern part of this country do not have running water in their homes, and 32 per cent of all families in southeastern United States are without private indoor flush toilets. Enforcement officials know well that outside community toilets, even when of the type connected to a sewer, are not satisfactory because of the high percentage of stoppages and other insanitary conditions, due to improper use, freezing, use of inadequate flushing devices, and lack of responsibility for maintenance, typical of most outside community toilets.

Other figures on housing from this same study¹ emphasize the magnitude

of the slum phase of the housing problem which is of primary concern to public health officials. For example, 13.9 per cent of all dwelling units in the United States needed major repairs with 2.3 per cent unfit for use. These figures vary from 20 per cent needing major repairs and 3.4 per cent unfit for use in the southeastern section, to 12.8 per cent and 2.3 per cent respectively in the northeastern section.

Of the families living in urban communities, 8 per cent paid less than \$9.99 a month for their living unit. The average percentage figure varied from 5.9 in the northeastern section to 36.6 in the southeastern section. In other words, more than one-third of the families of the southeastern section of the United States did not pay enough rent during this period to finance anything more than a shack without a toilet or sink and without other protection from the weather and insects.

According to Shelby M. Harrison² the 1942 President of the National Conference of Social Work, one-quarter of the population of the United States in 1933 needed public assistance and one-ninth even in 1940 needed it.

INADEQUACY OF PIECE-MEAL APPROACH

The problem of providing safe and healthful housing for all families may appear at first glance to be one primarily of forcing property owners to

* Presented before a Joint Session of the Conference of State Sanitary Engineers and the Conference of Municipal Public Health Engineers in St. Louis, Mo., October 26, 1942.

maintain or improve their property to meet a minimum standard. Tenants, however, have something to do with whether a house is substandard or not. The income from the property is influenced by the neighborhood environment and the state of repair in turn by the income of the tenant. The level of rents varies with the cycles of prosperity and depression and with the shifting of population and consequent change in percentage of vacancies. The difficulty is further complicated by an unbalanced allotment of areas in zoning plans, for business, industrial and residential use, and by heavy street traffic, lack of playground space, lack of nearby schools, churches, and shopping centers, heavy railroad traffic, heavy smoke, or inadequate transportation facilities.

It is not simply a matter, therefore, of the official accepting an assignment from the local newspaper, or a demand of public opinion, or even a request from the city administration to clean up the slums, but rather one of defining and measuring the problem on the basis of facts secured through objective investigation. The executive health officer and the engineer can then develop a housing philosophy and a plan of action commensurate with the importance of good housing as one of the foundation stones in a public health program, and co-ordinated with the plans of other local departments and agencies concerned with the housing problem.

The major effort at this time, however, in both man-hours and manpower, in some, if not most, of the divisions of sanitation in municipal health departments throughout the United States is directed toward the correction of insanitary conditions about the home. Even the directing health officers evaluate most of these programs as of minor public health significance and place them in the nuisance category. At the end of any year's work many of the grossly insanitary

conditions complained of are still uncorrected and at the end of each 10 year period about the same proportion of slums remains.

The Committee on the Hygiene of Housing is urging that the housing problem be met as a co-ordinated community program, and not as the usual routine enforcement program within the complaint division of many departments without reference to any overall objective and plan.

Dr. Huntington Williams, Health Officer of Baltimore, expressed the same feeling when he commented on his own experience.

It was apparent that the team in question was very much like a group of football players who were placed on a field without uniform, without preliminary coaching or training and under the gaze of an expectant grandstand, were called upon to produce with promptness a series of touchdowns; further, it became promptly apparent that no rules or signals had been established for their teamwork. From the early efforts it appeared as though one or another of the team at the signal secured the ball but ran in the wrong direction and made a touchdown for the opposite side.

A COMMUNITY PROGRAM

Some of the specific projects or programs in any community, which considered jointly make up a well balanced program, may be listed as: low cost subsidized housing projects, a planned long-range health department enforcement program, a sound real property tax delinquent policy, a sound rental policy of the welfare agencies, up-to-date legislation for the control of new housing, an enlightened nursing program, technological programs to reduce the cost of present assembly practices in building houses, an up-to-date balanced zoning plan, private housing construction and maintenance, and a definite plan for the rehabilitation of blighted areas. A co-ordinated program of this kind requires, of course, a leader

in each community, who must take the initiative in developing such a program and in obtaining the necessary team work for its accomplishment.

Some useful tools³ for measuring and defining the housing situation in any community have been developed by the American Public Health Association's Committee on the Hygiene of Housing.

Minimum standards⁴ for healthful housing have also been developed as a guide for the design and construction of all new housing. Practical standards which enforcement agencies can require as a condition to permitting occupancy in existing housing units, may have to be less than the ideal, and may vary for different communities according to the wage scales and the housing standards already prevailing in the community.

Once these practical standards are established, the annual cost required for remodeling and maintaining existing housing to meet the standard may be estimated. Incomes and rental paying ability of the population, when known, determine the percentage of families not able to pay these rentals. The sections of the city in which these people live will coincide roughly under usual conditions with the slum boundaries or the areas where houses needing major repairs predominate.

Besides the opportunities for leadership in the administrative aspects of the housing program, because of his position as engineer in the local health department, the planning field offers additional ground for action. City and regional planners have given little time and thought until recently to housing as one of the most important factors in the development of a sound plan for any community.

In large cities often as high as one-third of the areas subdivided for residential buildings have never been used, while large high taxed areas in the center of cities are being abandoned by

higher income people to slums and blight. Those who can afford it move to suburban areas which are often unplanned and without satisfactory arrangements for water or sewerage. The problem of supplying public utilities to these new areas and the impending waste of scrapping much of the large piping systems already installed in the old areas needs study and planning for more efficient land use.

The present necessities in supplying war housing must be blended with future objectives. Planning for post-war construction projects to tide us over while both the armed forces and defense industries are being demobilized should be particularly attractive to sanitary engineers, since housing is expected to play an important rôle in that period.

BUILDING AND FINANCING HOUSES

The cost of land, materials, and labor reach a minimum figure of about \$4,500 for a 4 room house with a 60 year life, even when built on a mass scale by the government. Under the normal system of building houses to sell, 80 per cent of all⁵ the new housing built during the boom years of the 1920's was built for sale or rental to the top 18 per cent of the people in the maximum income group.

Data prepared by the Division of Economic Research⁶ of the Bureau of Foreign and Domestic Commerce indicate the influence that the method of financing has on the percentage of people who can afford new housing or the lowest level of income that would support a new home. If a payment of \$20 a month at 8 per cent interest, amortized over a period of 20 years, will finance a \$2,500 house, the same payment of \$20 a month, at 3½ per cent interest and amortized over a period of 40 years, would finance a house that cost over twice that figure, or \$5,200.

The federal government's interest in encouraging private housing construction through the Federal Housing Agency has resulted in longer-term amortization periods, lower interest rates, and inspection to insure sound construction. This has resulted since 1935 in an increase in the production of new houses for families in income classifications previously considered as unsuitable markets for new houses. In 1936, for example, the median FHA valuation of new single family homes on which mortgages were accepted for FHA insurance was \$5,625, including land, while in 1940 this figure had declined to \$5,059. Since 1940 there has been a persistent downward trend in both valuation in homes built, and in the percentages of families having incomes less than \$2,500 and of \$2,000 who had invested in new homes.

Building laws, in some cases too stringent and outmoded, have added to the cost of building, and have limited the income group for which housing was built.

The building industry⁷ has been developed from a number of handicraft trades erecting the luxury type of house. It must be completely reconstructed to provide more efficient and less expensive methods of fabrication before any great saving in house construction can be realized. Cheaper and better materials are also needed. That the construction industry⁸ is awake to this challenge is evidenced by their efforts to encourage courses and training for engineers for recruiting by the industry. Courses are now offered in light construction engineering at 11 recognized engineering schools.

In normal years, 50 per cent of the total construction volume in dollar value is in housing construction. The U. S. Department of Commerce⁹ has recently estimated that the dammed-up demand for housing will reach 40 billions of dollars by 1945.

HOUSING, A PROBLEM FOR LOCAL ATTENTION

Although the problem of housing may be viewed on a national level, it is fundamentally a problem arising from local conditions. The local building, planning, enforcement, zoning, and taxing programs, as they affect housing, must be rationalized on the basis of the actualities in each specific community. Leadership is required to stimulate coordinated action by all those agencies whose individual programs provide the answers to some of the housing questions.

Continuing authoritative information, if available, would be of inestimable value to planners, enforcement officials, mortgage agencies, real estate interests, and even the renters and purchasers of housing who would benefit by a more stable and predictable housing market.

The future holds promise of an expanding program of public health activity in the fields of nutrition, housing, and medical care for all the people. Of these, no one field holds more challenge for the public engineer than that of housing.

No profession or group today, whether architect, builder, lawyer, doctor, or social worker, has the background of education, training, and experience to fit them better to lead in the sound development of a housing philosophy and program than the engineer in the local health departments. Why do they not meet this challenge as they have met other difficult issues in environmental control of the past three decades?

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"Doctor Jones" Says—

A letter I saw the other day: there was an article in *Health News* a while back about public health nurses and the war—said what a serious matter it was when one nurse left that was covering a whole rural county and how, in the big places where several nurses were employed by different agencies, their services ought to be coördinated so they could release some to handle these rural situations. It seems this woman read that and she wrote to the Health Department: said a lot of good nurses had gone to work in war industries; she thought there was something wrong, somewhere, when a nurse could get paid more on a job she knew practically nothing about than in the vital work she was 'specially trained for. She's got something there, that woman has.

The folks that're running the war—the Government—they recognize that protecting health on the home front—it's a necessary part of the war effort. In fact it's more important than ever. With people shifting around from this place to that and men coming back from tropical countries with new diseases and so on, there's more danger of epidemics and disease being spread around—to say nothing of morale. And this job of protecting health, it can't be done by just anybody that happens to be handy. It takes people with special training and experience: doctors, nurses,

sanitary engineers and milk sanitarians. It certainly don't look like good management to waste that kind of training and experience on a job somebody else could handle just as well—maybe better.

Of course the doctors—they've got this Procurement and Assignment Service—the Army and so on won't take 'em if this Board says they're essential where they are. Anyway, if I was a soldier and was sick or wounded I'd want a doctor that'd been practicing medicine—not doing public health work. And the engineers—I understand they're organizing the same sort of system for sifting 'em out.

The milk sanitation—in the Army it's all veterinarians. I suppose that's a hang-over from the old raw-milk days when the most they thought of was the cow. A veterinarian at least knew which part the milk came from. But today it's special training and experience that makes milk sanitarians, not what college they graduated from. Just being an M.D. or a D.V.M. don't make a milk sanitarian and some of the best of 'em ain't either one.

Yes, sir. Whether it's war or peace, or men or women, it's a pretty good idea to use folks in the jobs they're qualified for.

PAUL B. BROOKS, M.D.

Health News, New York State Department of Health, Apr. 26, 1943.

Food Handlers in the Army and Their Relationship to Salmonella Food Poisoning*

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THE rôle of the food handler in enteric disease transmission has been extensively studied, but due to the complexity of the factors involved, coupled with inadequate knowledge and means for the detection of dangerous disease carriers, there is a tendency generally to consider them to be of less importance than other factors involved.

In general, this may be true if we consider only the family unit which in normal times constitutes the greater part of the living environment of the world's population. However, the congregation of large elements of the population in armies or cities where other than family contacts predominate in the environmental picture, such as in eating places, places of entertainment, in transportation, places of employment, and schools, presents greater opportunities for disease carriers, and particularly those engaged in food handler rôles, to transmit their infections to non-immunes. These circumstances are always more prevalent during war, disasters, or economic upheavals resulting in mass movements of populations. The present war is no exception—in fact, it is causing a more serious disruption of populations than any experienced

in the past. This is due to the ease with which great numbers of individuals can be transported to distant places with transportation means now available, and to the deep penetration of bombing aircraft into areas other than those of actual combat. This results in a greater destruction of the habitations of man and the basic industries that provide for his livelihood. Aside from the destruction of sanitary facilities and equipment, these factors all tend to break up family units and provide dispersion of disease carriers into non-immune populations, thus setting the stage for major disease outbreaks. It is therefore obvious that our civil population and our armed forces will be increasingly exposed to these detrimental influences.

The Army must by necessity gather its personnel from all sections and classes of our populations and must for training and combat purposes bring them together in large numbers. These individuals may be required to serve in any part of the world and will be exposed to whatever diseases are present in the areas concerned. Under these conditions, the food handler carriers of communicable disease will undoubtedly play an important rôle in the prevalence of disease among our troops.

There is plenty of evidence that the Salmonella group of organisms may be

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

of importance in enteric disease outbreaks that may be encountered. Experience in the Panama Canal Department during 1940 and some of the bacteriological findings in outbreaks encountered to date lend support to this statement. Small outbreaks of food poisoning, diarrhea, and dysentery had been occasionally occurring in various commands in the Panama Canal Department prior to 1940. This led in May of that year to a careful laboratory investigation of the factors involved by the Bacteriology Department of the Board of Health Laboratory, Ancon, Canal Zone, aided by a field investigation conducted by Lt. Col. W. C. Cox, M.C., Assistant Department Surgeon, Panama Canal Department. Twelve food poisoning outbreaks occurred between May and December 31, 1940, and various species of *Salmonella* were isolated as the etiological agents from the cases occurring in eleven of the outbreaks. There was a direct correlation between the species of *Salmonella* and *Shigella* isolated from food handler carriers and the cases of food poisoning occurring in each outbreak. Detection of the carriers and their removal from food handler duty stopped the occurrence of these infections in the commands concerned. It must be pointed out that the food poisoning outbreaks were usually preceded by a few scattered cases, followed by an explosive outbreak — then a continued small incidence of the disease until the food handler carriers were detected and removed from duty, after which no new cases developed.

As a part of the food handler examinations, three stool specimens were collected on alternate days from each individual and cultured for intestinal pathogens. These specimens were delivered to the Board of Health Laboratory within 24 hours of their collection and, for the detection of the *Salmonella* typhoid groups present,

were planted in Selenite F broth, followed by incubation of the broth at 37° C. for 18 to 24 hours. Heavy inoculations of the seeded broth were then made to large Endo plates (150 x 12 mm.) and bent glass rods used for streaking. It was our experience that proper separation of sufficient colonies could not be obtained by using the small Petri dishes. Further, if inhibitive media were used for plating instead of the Endo medium, that colonies picked would frequently not be in pure culture and would require further plating on Endo or E.M.B. medium before carrying out definitive studies.

After plated cultures were incubated overnight, suspicious colonies were picked and inoculated into Kligler's iron medium. Cultures on this medium giving characteristic reactions of the *Salmonella* or *Shigella* groups were tested for agglutination in 1–100 dilutions of O and H group specific sera. Those giving specific agglutination were further studied and classified by the use of sugars and morphological examination. Positive cultures roughly classified in the *Salmonella* group were then forwarded to Dr. P. R. Edwards of the Department of Animal Pathology, University of Kentucky, Lexington, Ky., for definitive species identification, as certain specific H agglutinating sera were not available locally.

Sixty-six hundred and seventeen stool specimens were examined from approximately 2,000 individuals. Of this group, 49 were found to be carriers of intestinal pathogenic bacteria, or an average incidence of 2.45 per cent. Of this group, 40 were carriers of *Salmonella* other than *Salmonella typhi*, 4 of *Salmonella typhi*, and 5 of *Shigella*.

The *Shigella* carriers were made up of 3 positive for the Sonne bacillus, and 2 for the Flexner group of dysentery bacilli. Fourteen species of *Salmonella* were isolated. The type and number of carriers of each species are given in

Table 1. The findings on all carriers were confirmed by additional cultures after the first isolation. Some of the *Salmonella* carriers yielded positive cultures over a 60 day period.

TABLE 1
Panama Canal Zone, 1940

| Species | Number of Carriers |
|---------------------------------|--------------------|
| <i>S. paratyphi</i> B | 2 |
| <i>S. paratyphi</i> B Var. Java | 12 |
| <i>S. typhimurium</i> | 5 |
| <i>S. derby</i> | 2 |
| <i>S. paratyphi</i> C | 2 |
| <i>S. oranienburg</i> | 3 |
| <i>S. montevideo</i> | 1 |
| <i>S. newport</i> | 6 |
| <i>S. typhi</i> | 4 |
| <i>S. panama</i> | 3 |
| <i>S. give</i> | 1 |
| <i>S. anatum</i> | 1 |
| <i>S. arechavaleta</i> | 1 |
| <i>S. saint paul</i> | 1 |
| | 44 |

The distribution of food handler carriers by place and type of personnel is given in Table 2.

TABLE 2
Carriers, Salmonella, Found on Stool Examination during 1940, by Place of Duty and Status

| Place of Duty | Military Personnel | Civilians | Total |
|-----------------|--------------------|-----------|-------|
| Albrook Field | 2 | 1 | 3 |
| Fort Amador | 3 | 1 | 4 |
| Fort Clayton | 3 | 20 | 23 |
| Post of Corozal | 2 | 0 | 2 |
| Panama | 0 | 1 | 1 |
| Camp Paraiso | 3 | 1 | 4 |
| Quarry Heights | 2 | 1 | 3 |
| Fort Randolph | 0 | 2 | 2 |
| Rio Hato | 0 | 1 | 1 |
| Fort Sherman | 1 | 0 | 1 |
| Totals | 16 | 28 | 44 |

The distribution of the carriers by posts shows a total of 23 for Fort Clayton. A possible explanation of this occurrence was the size of this command and the fact that three fair-sized outbreaks of food poisoning occurred at this post during the period of investigation. The principal organism isolated from cases and carriers at Fort Clayton was *Salmonella paratyphi* B Var. Java.

The medical history of most of the food handler carriers was essentially

negative for gastrointestinal symptoms or a history of food poisoning or diarrhea within 6 months of their detection as carriers. Six of the group gave a history of diarrhea within 3 months' time, but none of them within a period of 1 month prior to the examination. One gave a history of diarrhea 2 years previously and one gave a history of right upper quadrant pain for about 1 month previous to the time of examination.

All positive food handlers were hospitalized and were not allowed to assume their vocation until repeated stool cultures over a 30 day period showed the absence of intestinal pathogens.

SUMMARY

The potential rôle of food handler carriers of *Salmonella* and *Shigella* as a possible source of epidemic disease outbreaks during the present war is

discussed and the Army experience in the Panama Canal Zone during 1940 with food handler carriers of *Salmonella* and *Shigella* presented. Two thousand food handlers were examined—44 were positive for *Salmonella*, and 5 positive for *Shigella*; 14 species of *Salmonella* and 2 species of *Shigella* were isolated. Positive food handlers were generally asymptomatic and were associated with small epidemic outbreaks of food poisoning and diarrhea.

Use of Ratings in the Evaluation of Exhibits

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THE evaluation of exhibits in health education becomes increasingly essential as public health workers make more frequent use of that medium. At almost all state or county fairs, conventions, or other large gatherings there will be found one or more health exhibits, many of which are complicated and expensive. Despite increased interest in using exhibits, there is little objective evidence concerning their effectiveness. Generally the sole evaluation of an exhibit before it is put on display is the judgment of the exhibitor and his associates. Are such ratings dependable, and can large expenditures for exhibits be justified on subjective opinions?

That the validity of ratings may be open to some doubt is suggested by previous studies of ratings on the quality of drawings, English compositions, and handwriting. As early as 1910 Thorndike asked 30 judges to rate 37 specimens of handwriting for quality.¹ In rating one of the specimens, one judge stated that the writing was of the highest quality; 5 stated it was of the poorest; and the ratings by the other 24 judges were distributed throughout the range between best and poorest. Later, Thorndike,² Cohen,³ and others showed similar variations in ratings of drawings, and Hillegas⁴ demonstrated that

ratings are unreliable measures of quality in English composition.

Although as a result of such studies those in educational measurement no longer use ratings as a means of evaluating educational materials or products, constructors of health exhibits have seldom utilized any other measure of effectiveness. For that reason it has seemed advisable to investigate exhibit ratings to ascertain whether such evaluations are reliable; and the New York World's Fair presented an excellent opportunity for that investigation. Grouped in the Medicine and Public Health Building were many exhibits prepared by many health workers, with extremely diverse ideas as to effective exhibit technic, including all sorts of combinations of movement, color, and arrangement. Twenty-six major ones were selected for study.

In evaluating, two questions were posed: Could professional workers agree on the most effective exhibits in the group? Could they also agree in selecting the least effective displays?

RATINGS BY PROFESSIONAL WORKERS

Two hundred and seventy-one professionally trained persons, including public health workers, educators, students in professional school, and professional exhibitors were asked to

TABLE 1

Relative Frequency with Which 26 Health Exhibits Were Rated as "Best" or "Worst" by Professional Workers

| Name of Exhibit | Percentage of Professional Workers Rating the Exhibit as One of the Three— | |
|---------------------------------|---|---------|
| | "Best" | "Worst" |
| Maternal Health | 51.7 | 4.1 |
| Maze of Superstition | 26.9 | 10.3 |
| Education of the Blind | 25.8 | 1.1 |
| Industrial Sanitation | 24.7 | 0.7 |
| Cancer | 20.7 | 4.4 |
| Dental Science | 18.1 | 3.7 |
| Pneumonia | 17.7 | 8.5 |
| Milk Control | 15.5 | 3.7 |
| Carrel-Lindbergh Apparatus | 14.4 | 8.5 |
| Heart and Circulation of Blood | 12.6 | 8.1 |
| Allergy | 12.6 | 5.9 |
| Glands of Internal Secretion | 10.7 | 4.4 |
| Immunity, Infections, Viruses | 8.9 | 4.1 |
| Syphilis—"Shadow on the Land" | 6.6 | 5.9 |
| Housing for Health | 6.3 | 22.9 |
| Tuberculosis | 5.2 | 12.9 |
| Chest X-ray Demonstration | 4.8 | 17.7 |
| Mental Hygiene | 4.4 | 8.5 |
| Social Hygiene in Your Town | 3.7 | 3.3 |
| Your Health Department | 3.3 | 28.0 |
| Medical Education | 2.6 | 13.3 |
| Safeguarding Medicinal Products | 2.6 | 11.1 |
| The Anemias, Story of Diabetes | 2.2 | 13.3 |
| Anesthesia | 2.2 | 8.1 |
| Veterinary Medicine | 1.9 | 11.8 |
| Child Health | 0.7 | 16.2 |

review the exhibits and select the first, second, and third best as well as the three which they considered as the worst of the 26. Judgments were to be made in accordance with the following instructions:

Please rate the exhibits in the Hall of Medicine on the basis of *at least* the following characteristics: (1) clarity of presentation, (2) general attractiveness, (3) integration of panels, and (4) value of information portrayed.

In addition, the rating form provided space for the judge to state his reason(s) for rating any given exhibit as "best" or "worst."

A tabulation of the frequency with which each exhibit was rated as one of the three best or one of the three worst is shown in Table 1.

Low percentages appearing in both columns for a given exhibit indicate marked lack of agreement among the judges on its relative merit. On only one exhibit (*Maternal Health*) did as many as half the judges agree that it

was among the three best exhibits shown, and even on that one 11 of the 271 raters (or 4.1 per cent) considered it as one of the three worst.

No other exhibit was placed in the best or worst position by a majority of the raters; only 6 others were rated in a similar fashion by as many as one-fifth of the raters. For example, 73 judges rated the *Maze of Superstition* exhibit as one of the three best, but 28 others called it one of the three worst. Clearly, these data indicate that the criteria which the raters used were not applied consistently by the 271 individuals.

Further evidence of the lack of agreement between the judges is afforded through the following quotations from the rating blanks on given exhibits.

It may be argued that much of the disagreement may have been due to the different types of professional groups asked to rate the exhibits. To test that hypothesis, the judges were divided into four more or less homogeneous group-

QUOTATIONS FROM RATING BLANKS

Anesthesia Exhibit

"This exhibit portrays the place of anesthesia in modern surgery in such a manner that fear of possible pain and fear of anesthetic accident is removed. The scene of operation is quite accurately portrayed, with no attempt to dramatize the situation. The life-size moving figures are convincing. One leaves the exhibit with a feeling of reassurance."

"Here is an opportunity for a fine piece of work and what is there here—nothing but a hospital operating room—offers nothing to onlooker in an educational way. One glance and people walked away."

Dental Exhibit

"Presented very clearly and attractively; panels very well integrated. Affords definite information as to cause of dental decay and malformation impressing necessity of prenatal care, area (enamel) attacked first, correct method of cleaning teeth, value of early and regular visits to dentist; how personal appearance is improved by insertion of dentures. An excellent visual method of emphasizing care of teeth, especially for children."

- "1. Negative
2. Uninteresting
3. Rather gruesome
4. Poorly organized
5. No participation by observers
6. Exhibit lost a fine opportunity of presenting some fine lessons in practical dental health education."

Social Hygiene Exhibit

"The general idea of presentation I thought was very good as well as being attractive. It makes one conscious of what the community can do for one. The general placing of the institutions was instructional. Exhibits of this type would lead to better health (mental and physical) and a general improved community life. It showed good integration."

"The colors are dull and lack all visual appeal. The name social hygiene, I believe, should be explained to the lay public. It is a somewhat misleading term. Many illustrations are used as a method of conveying information. These are inadequate, due to poor workmanship and lack of sufficient explanation. The name 'social' leads to much confusion on the entire exhibit. The integration of panels is without any logical sequence."

ings: public health workers (112 in number), educators (84), students of medicine or education (66), and professional exhibitors (9); and their ratings tabulated separately. The percentage of agreement in each professional group is shown in Table 2. There is no evidence in that table to indicate that there is any closer agreement when the ratings are tabulated by homogeneous professional groups than when they are considered as though made by a mixed group of professional workers. In only one homogeneous group and for only

one exhibit (the students, in rating *Maternal Health*) was there a majority opinion on a specific exhibit. The same general lack of agreement exists throughout the table.

WHAT THE PUBLIC THINKS OF EXHIBITS

In order to determine whether the reactions of the general public (who, after all, are the ones for whom the exhibits were prepared) were more reliable than the judgments of experts, 18,449 lay spectators also were asked to rate the exhibits. Their instructions

TABLE 2

Relative Frequency with Which 26 Health Exhibits Were Rated as "Best" or "Worst" by 4 Professional Groups

| Exhibit | 112 Public Health Workers | | 54 Educators | | 66 Students of Medicine or Education | | 9 Professional Exhibitors | |
|---------------------------------|---------------------------|--------------------|--------------|-------|--------------------------------------|-------|---------------------------|-------|
| | Best ¹ | Worst ² | Best | Worst | Best | Worst | Best | Worst |
| Maternal Health | 49.1 | 0.0 | 47.6 | 7.1 | 62.1 | 6.1 | 44.4 | 11.1 |
| Maze of Superstition | 38.4 | 0.9 | 19.0 | 1.2 | 7.6 | 0.0 | 33.3 | 0.0 |
| Education of the Blind | 33.0 | 1.8 | 16.7 | 0.0 | 27.3 | 1.5 | 11.1 | 0.0 |
| Industrial Sanitation | 27.7 | 2.7 | 10.7 | 4.8 | 21.2 | 7.6 | 22.2 | 0.0 |
| Cancer | 21.4 | 4.5 | 19.0 | 2.4 | 10.6 | 1.5 | 22.2 | 22.2 |
| Dental Science | 20.5 | 3.6 | 19.0 | 7.1 | 9.1 | 18.2 | 33.3 | 11.1 |
| Pneumonia | 14.3 | 13.4 | 41.7 | 2.4 | 28.8 | 15.2 | 33.3 | 11.1 |
| Milk Control | 14.3 | 3.6 | 16.7 | 3.6 | 16.7 | 4.5 | 11.1 | 0.0 |
| Carrel-Lindbergh Apparatus | 12.5 | 4.5 | 16.7 | 8.3 | 7.6 | 6.1 | 11.1 | 0.0 |
| Heart and Circulation of Blood | 9.8 | 8.9 | 16.7 | 7.1 | 16.7 | 10.6 | 33.3 | 0.0 |
| Allergy | 8.0 | 8.0 | 9.5 | 3.6 | 25.8 | 15.2 | 0.0 | 0.0 |
| Glands of Internal Secretion | 8.0 | 5.4 | 6.0 | 6.0 | 3.0 | 6.1 | 22.2 | 11.1 |
| Immunity, Infections, Viruses | 8.0 | 2.7 | 9.5 | 7.1 | 10.6 | 3.0 | 0.0 | 0.0 |
| Syphilis—"Shadow on the Land" | 7.1 | 16.1 | 4.8 | 4.8 | 1.5 | 16.7 | 11.1 | 22.2 |
| Housing for Health | 5.4 | 7.1 | 6.0 | 13.1 | 1.5 | 6.1 | 0.0 | 0.0 |
| Tuberculosis | 4.5 | 24.1 | 7.1 | 20.2 | 9.1 | 27.3 | 0.0 | 0.0 |
| Chest X-Ray Demonstration | 4.5 | 12.5 | 2.4 | 23.8 | 9.1 | 16.7 | 0.0 | 33.3 |
| Mental Hygiene | 4.5 | 11.6 | 2.4 | 16.7 | 0.0 | 1.5 | 0.0 | 22.2 |
| Social Hygiene in Your Town | 4.5 | 6.3 | 1.2 | 15.5 | 0.0 | 3.0 | 0.0 | 0.0 |
| Your Health Department | 4.5 | 2.7 | 8.3 | 6.0 | 25.8 | 6.1 | 0.0 | 0.0 |
| Medical Education | 4.5 | 2.7 | 6.0 | 6.0 | 0.0 | 1.5 | 0.0 | 0.0 |
| Safeguarding Medicinal Products | 2.7 | 33.9 | 4.8 | 19.0 | 1.5 | 28.8 | 11.1 | 33.3 |
| The Anemias, Story of Diabetes | 2.7 | 3.6 | 3.6 | 19.0 | 1.5 | 21.2 | 0.0 | 22.2 |
| Anesthesia | 0.9 | 17.9 | 1.2 | 16.7 | 0.0 | 15.2 | 0.0 | 0.0 |
| Veterinary Medicine | 0.9 | 9.8 | 2.4 | 10.7 | 1.5 | 16.7 | 11.1 | 11.1 |
| Child Health | 0.9 | 8.0 | 2.4 | 10.7 | 4.5 | 25.8 | 0.0 | 11.1 |

¹ Per cent of group rating exhibit as one of the three best.

² Per cent of group rating exhibit as one of the three worst.

TABLE 3

Relative Frequency with Which 26 Exhibits Were Rated as "Liked Most" or "Liked Least" by 18,449 Lay Spectators

| Exhibit | Per cent Liked Most | Per cent Liked Least |
|---------------------------------|---------------------|----------------------|
| Tuberculosis | 28.1 | 8.6 |
| Carrel-Lindbergh Apparatus | 28.1 | 2.2 |
| Industrial Sanitation | 26.5 | 3.2 |
| Education of the Blind | 26.1 | 2.6 |
| Safeguarding Medicinal Products | 25.0 | 2.8 |
| Cancer | 24.0 | 3.5 |
| Heart and Circulation of Blood | 23.0 | 5.1 |
| Social Hygiene in Your Town | 21.9 | 5.0 |
| Pneumonia | 19.2 | 2.8 |
| Housing for Health | 18.6 | 5.8 |
| Allergy | 18.4 | 2.7 |
| Anesthesia | 15.0 | 3.8 |
| Milk Control | 13.8 | 5.5 |
| Maternal Health | 11.9 | 8.3 |
| Glands of Internal Secretion | 11.6 | 16.0 |
| Chest X-Ray Demonstration | 11.6 | 6.8 |
| Your Health Department | 11.5 | 3.9 |
| The Anemias, Story of Diabetes | 11.4 | 5.6 |
| Maze of Superstition | 9.7 | 6.7 |
| Dental Science | 9.4 | 3.8 |
| Syphilis—"Shadow on the Land" | 9.3 | 5.1 |
| Immunity, Infections, Viruses | 6.6 | 9.9 |
| Child Health | 6.5 | 9.1 |
| Veterinary Medicine | 6.2 | 21.1 |
| Mental Hygiene | 5.0 | 10.3 |
| Medical Education | 1.6 | 5.0 |

were to check, on a rating form, the exhibits at which they had stopped. On the form were listed the 26 major exhibits which had been rated by the professional workers, and beneath the list were the following instructions:

"Of the exhibits checked above, please list the three exhibits you liked most and the three you liked least."

Spaces were provided for the choices.

Tabulation of their preferences, as shown in Table 3, indicates no direct overwhelming agreements. For only 8 exhibits did more than one-fifth of the spectators express a preference.* It would seem that judgments by laymen are also unreliable as criteria to judge the effectiveness of exhibits.

DO PROFESSIONAL WORKERS AND THE PUBLIC AGREE?

There was also considerable disagreement between the ratings of the professional group and those of the laymen. Of the former, 51.7 per cent rated the *Maternal Health* exhibit as best, but only 11.9 per cent of the laymen gave it the same rating. Similarly, 16.0 per cent of the laymen rated *Glands of Internal Secretion* as worst, whereas only 4.4 per cent of the professionals gave it the same rating. In rating another exhibit (*Tuberculosis*) 28.1 per cent of the laymen indicated it as one of the best, yet only 5.2 per cent of the professional raters made a similar selection.

Thus, there was disagreement among the professional groups constructing, using, and evaluating exhibits; among the members of the public for whom the exhibits were intended; and between those making the exhibits and those for whom the exhibits were made. What, then, is the value of ratings of this type in the evaluation of exhibits?

* As an example, 2,195 laymen rated the *Maternal Health* exhibit as one of the three best, but 1,531 others rated it as one of the three worst.

SUMMARY AND CONCLUSIONS

The increased interest in exhibits and their use for health education warrants an evaluation of their effectiveness if expenditures for exhibits are to be justified. An attempt at such an evaluation of the health exhibits at the New York World's Fair was undertaken in 1939. This paper reports the reliability of ratings as one technic of measuring the value of the exhibits.

In the study reported, 271 professional workers comprising public health personnel, educators, students of education or medicine, and professional exhibitors; and 18,449 lay spectators rated 26 major exhibits. The professional workers designated the three "best" and the three "worst," and the lay raters indicated the three "liked most" and the three "liked least."

On only one of 26 exhibits did as many as half the professional raters agree it was among the three best exhibits shown, and even that one was rated among the worst by 11 of the 271 judges. Only 6 others were rated similarly by as many as one-fifth of the raters. The ratings indicate that the raters' criteria were not consistently applied by the 271 individuals. There was no closer agreement when the ratings were tabulated by homogeneous professional groups (public health, educator, student, or exhibitor) than when they were by the total.

On only 8 of the 26 exhibits did as many as one-fifth of the lay raters express agreement in preferences. Apparently, judgments by laymen are also unreliable as criteria to judge the effectiveness of exhibits.

Consistent with the disagreements found in the professional and lay groups were the differences between the two groups of judges. The raters who normally construct, evaluate, and use exhibits did not agree with the lay public for whom they make exhibits.

With such disagreements among the

raters, it may be concluded that ratings are of little or no value in the evaluation of exhibits. Methods of evaluation which are more valid and reliable and depend more upon the behavior of the spectator must replace ratings, if the true value of health exhibits as educational media is to be appraised.*

Subsequent papers will describe the use of such technics of evaluation as: (1) timing the length of stay at an exhibit and checking it with the time required to read the legends, (2) checking the spectators' statements of the objectives of the exhibit, from viewing it, with the objectives as stated by the

exhibitor, and (3) testing information and attitudes of spectators as they have been affected by exhibits. It is hoped that similar objective studies may be undertaken of the effectiveness of pamphlets, posters, movies, and other accepted health educational technics. Only thus can we assemble the evidence necessary to justify increases in budgets for popular health education.

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* A few suggestions on exhibit technic arising from studies of spectator reaction have already been reported in this *Journal* for March, 1941.

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NEED FOR EXTENSION OF LOCAL HEALTH SERVICE

ATTENTION of JOURNAL readers is called to the report of the Association's Committee on Local Health Units. This report appeared in the April, 1943, issue of the JOURNAL, and is carried under the title, "Units of Local Health Service for All States." It is perhaps one of the most important and significant documents ever published by an Association committee. Here is a statesman-like plan for reasonably adequate local health service in all communities of the United States; a setting forth of broad general principles and objectives. The report represents thinking in terms of the whole and all of its parts, and heralds a consciousness that advance in quality and quantity of public health service rendered in the United States must no longer be limited to a nibbling and chipping process. It insists, too, upon local initiative and responsibility, and recognizes the importance of the private physician and of hospitals in providing public health services.

The committee which submits this report has been working diligently for a number of months. It has carefully analyzed the extent and character of local health service as it at present exists. It has set forth certain ideas which it considers basic and, with these in mind, and in conference with the respective state health officers concerned and with members of the medical profession, has laid down as a preliminary the estimated number of units which probably would be necessary for complete coverage in each state. The results of deliberation along these lines were presented graphically for the several states at the last Association meeting. These maps attracted a good deal of interest and aroused a lot of discussion, which is what was intended. The committee will continue its work by further conference with appropriate officers of state government and with representatives of state medical societies; will analyze existing state laws bearing upon establishment of local health services; and will study further the costs and personnel needs which should on the average be met in jurisdictions of one size or another.

The committee will, of course, encounter difficulties in the development of its program, but these are to be expected. Thus the committee advises adminis-

trative districts that would in some instances cut into and across existing civil jurisdictions. Members of state legislatures and local office holders are inclined to look upon this sort of suggestion as political dynamite, and will invoke in full measure the sanctity of tradition and local autonomy. Further difficulty will be encountered in obtaining legislation that will permit or require provision of health service as a function of local government. The permissive type of law is more readily passed by a state legislature, and in fact exists in many states, but it leaves much to be desired. With such a law, local authorities must first be persuaded to decide upon and pay for health service and from then on, even though performance is competent, the local service constantly stands in jeopardy of discontinuance because of local decisions which have but little to do with the merits of the case. No community would think of discontinuing schools because an influential local group disliked the Superintendent of Education, but this can happen and has happened in new ventures in public health. In contrast to the permissive legislation, a law requiring that local jurisdictions provide and expend money for local health purposes would be more difficult to get through the state legislature but this type of law is probably, in the last analysis, a very necessary instrument if health service coverage is to be complete and continuing. Finally, the plans of this committee will undoubtedly receive some opposition from some of the state health officers. Part of this will be justified and part of it unjustified. State health officers as a genus do not like to have persons in remote places, perhaps behind desks, tell them how to organize and administer public health work in their respective states. In many instances in the arguments that will ensue, this state health officer or that one will be right and the committee will be wrong, for the latter cannot know of all the complexities in each locality. Opposition on this basis will be constructive for, in the long run, divergence in detail as to districting, organization, and administration, will tend to prevent too rigid a pattern and stagnation. On the other hand, there ought to be no opposition to general principles if those principles are sound. On this point, one is encouraged by the background and character of the persons who make up the committee. They possess both technical knowledge and long administrative experience.

If the plan of the committee has any inherent weakness, it is that it visualizes only present conventional public health service, taking no cognizance of the fact that the health department of the future is quite likely to be concerned with medical service of one form or another. Health officers are loath to consider this for, while few of them can give undivided support to the thesis that all is well with today's medical care, most of them distrust measures tending toward a socialization of medicine. Further, they know from past experience that in any combination of medical service and conventional public health activities there is likely to be trouble in administering the first and a probable atrophy and disruption of the second. The committee may have been wise in avoiding this question, which is of itself a major issue. To include it certainly would complicate the picture, diffuse the objectives, and increase the opposition.

Be all these things as they may, we urge that JOURNAL readers become detailedly familiar with this report of the Committee on Local Health Units; that members of the Association become apostles for the general idea of complete coverage of the nation by adequate full-time local health service under government auspices; and that the committee continue its good work.

THE DEATH OF DR. A. GRANT FLEMING

DR. ALBERT GRANT FLEMING, Professor of Preventive Medicine and Public Health, McGill University, died in Montreal on April 9 after some months of illness. His death was not unexpected, but this does not lessen the sense of loss of those who knew him or knew of his work.

Dr. Fleming was President-Elect of the Canadian Public Health Association, and in the American Public Health Association he was a member of the Governing Council. In 1939 he served as Vice-President of the latter Association. In the last war he won the Military Cross for gallantry under fire, and at the time of his illness was scheduled to head the section of preventive medicine in the Canadian Army. He received the King's Jubilee Medal in 1935 and won the Coronation Medal in 1937. In the period 1936-1940 he was Dean of the Faculty of Medicine in McGill University, and since 1928 was Director of the Department of Preventive Medicine and Public Health in that Faculty.

This record and these accomplishments did not arise through accident, for Grant Fleming possessed a rare combination of medical competence and sound administrative ability. Exhibiting in finest measure the caution of the scientist and the vision of those who see beyond today, he was equally comfortable in laboratory and debate; and, endowed with an unusual personal graciousness, he could be forceful without dogmatism, could disagree without being disagreeable.

With our Canadian colleagues we share in the loss of a leader in the field of public health; and with the people of Canada we sympathize in the death of one of her public health statesmen.

THE U. S. PUBLIC HEALTH SERVICE IS COMMENDED

SOME two months ago there appeared in the *Washington* (D. C.) *Post* an article entitled "Crackdown on Vice Scatters Disease-Bearers." This was written by Agnes E. Meyer and is one of a series in which the author reports shrewdly and frankly upon conditions existing in centers of war activities. It is not, however, the series as a whole or the findings set forth in this article with which we are concerned, but rather with an excerpt from it. This is in reference to the U. S. Public Health Service, and is as follows:

"Mayor Devin's (Mayor of Seattle, Washington) words of gratitude to the United States Public Health Service expressed a feeling that has been growing steadily in my own mind as I traveled through the country. Wherever I have encountered members of this Federal department whether in central positions or in the most remote outposts of our social battle line, I have found such a uniformly high quality of character and ability, such passionate and fearless devotion to unending duties, that it seemed to me as if the highest manifestation of unselfish idealism is manifest today among the men of science."

Mrs. Meyer, who is the wife of the publisher of the *Post*, is known as one who does not make this sort of comment without careful and skillful weighing of evidence, and it is therefore particularly gratifying that she pays such a tribute to a great Service. Many of those engaged in public health work, and the federal government in particular, are inclined to take the U. S. Public Health Service for granted, tend too much to believe that it is just another government bureau; and Congress, under the pressure of military necessities, is likely to lose sight of how

competently and quietly the Public Health Service has met the multifold and complex problems imposed upon it by the war.

The qualities of skill and devotion to duty in these Public Health Service officers whom Mrs. Meyer met are to be expected. They have been carefully trained and thoroughly indoctrinated in the fine traditions of the U. S. Public Health Service. They are thus conscious not only of duty but of responsibility to maintain the justly-acquired prestige of the organization they represent. And, too, their very presence in the various mushroom communities in military and industrial areas of the country where Mrs. Meyer met them indicates forehandedness and intelligent planning on the part of the Surgeon General and his staff. Not only are these Public Health Service officers concerned with control of venereal diseases, but with malaria control, industrial hygiene, with measures directed against typhus fever and plague, with control of stream pollution, acute communicable disease control, with strengthening local and state programs against tuberculosis, and with the day by day task of building up ordinary routine health services. One encounters them, too, in Public Health Service research laboratories; as medical officers for the Coast Guard; in Marine Hospitals; and in a few unusual and distressing situations where the loss of physicians has created an emergency, one finds them temporarily rendering actual medical care.

The remarkable aspect of this participation of federal health officers in state and local health work is that there has been no complaint of invasion of states' rights, no usurpation of local authority, no friction. On the contrary, they have been requested, welcomed, and relied upon. They are well oriented as to the ethics and legalities of the situations in which they find themselves and of the limits of their authority as federal officers; and state health officers, through years of cordial relationship with the Public Health Service, have come to trust the wisdom and integrity of that Service.

We set these matters forth with two things in mind. The first is to concur in Mrs. Meyer's words of praise of the Public Health Service; and the second is to reemphasize, to the medical profession and other public health workers, and to the public, that this organization is the logical federal agency around which to build national health programs in both war and peace.

LETTERS TO THE EDITOR

TO THE EDITOR:

Under existing conditions with fluid milk shortages in the offing, it is more desirable than ever to have a uniform milk code to be able to shift milk supplies over a wide area. The *U. S. Public Health Code* is generally advanced for this purpose.

The main difficulties with the *U. S. Public Health Code* are no provision for the detection and elimination of thermophilic and thermoduric bacteria contamination of milk by dirty utensils and the lack of personnel and transportation for such farm inspection, and the lack of material and labor for such changes as the inspection would indicate. Also there is no guarantee that milk produced under adequate conditions would be of adequate quality.

The milk code of the Boston Health Department could serve. This code is based on continuous inspection of the quality of the milk as it arrives at the creamery, rather than on production conditions, as determined by one farm inspection a year.

1. A sample of each farmer's milk must be taken once a month and analyzed as follows:

- a. A Breed smear for approximate raw count and presence of udder infection.
- b. Laboratory pasteurized count—plated at 32° C.—for washing and sterilizing of equipment.
2. If the count is over 400,000 raw or 20,000 pasteurized, an official warning is sent the farmer.
3. A recheck must be taken in 10–15 days. If the 2d sample is high, the farmer is shut-off until a check sample is found to meet requirements.

In actual operation it is the responsibility of the country plant manager to visit the farmer after the first high count to insure against a second high count for a shut-off.

Centralized laboratory facilities could simplify the operation and supervision and reduce expenses. In most cases existing laboratory facilities can be converted to cover large areas adequately.

Any milk under 400,000 raw, 20,000 pasteurized and free from all udder infection as insured by laboratory analysis would meet approval from most milk inspection authorities.

THEODORE MARCUS, M.Sc.,
Dorchester, Mass.

THE following letters bring to a close the discussion of certain points, statistical in nature, raised by Mr. H. M. C. Luykx of New York University College of Medicine. Mr. Luykx' letter appeared in the April issue of the JOURNAL.

TO THE EDITOR:

The comment of Mr. Luykx on the convention of attaching a measure of sampling error to a statistic by means of a \pm sign, and his speculation concerning probable interpretation of it, is interesting from many points of view. There would probably be complete agreement that it should always be stated whether the measure following

\pm is a "probable error" or a "standard error." And there can be no question but that there is need for clearer understanding of how the error measures are correctly to be interpreted, particularly in view of the wholly erroneous statements repeatedly occurring in a very recent textbook on vital statistics. But there is likely to be conflict of

opinion on the view that "the use of the \pm following an average is distinctly undesirable," especially when supplemented by the view that a careful reader would "make it his business to understand the meaning of standard error." The reader is not likely to become careful just because a \pm sign is not there! Intellectual laziness may indeed be encouraged by a sign which obviously indicates an error range of some sort, but surely only in those not likely to be aroused by the presence of a substitute expression.

The question to this writer frames

itself somewhat in this way: Isn't there more to lose than to gain by dispensing with a sign which even the uninitiated realize immediately indicates a measure of uncertainty? His personal opinion at present is definitely in the affirmative. But let us be careful to define our measures and to understand them, without which no form of statement will be of much avail.

ALAN E. TRELOAR,
Associate Professor of Biostatistics,
University of Minnesota Medical
School

TO THE EDITOR:

Several points are raised by the comments of Mr. H. M. C. Luykx.

1. The "Epidemiologic Note" in the January issue of the *American Journal of Public Health* stimulating the comment of Mr. Luykx has been taken from material in the summary of the original article appearing in the November 14, 1942, issue of the *Journal of the American Medical Association*. Discussion of statistical procedure should have been directed preferably to the author, who knows best of all what he did and why, or at least to the organ publishing the original material.

2. Had Mr. Luykx reconstructed the calculations based on the data presented in the original article, he would have found the \pm attachment to be the *standard* error of the mean and *not* the *probable* error on which the commentator makes so detailed an explanation.

3. It is a well known fact that the standard error is a more acceptable measure than is the probable error. For that reason common agreement almost tacitly assumes a \pm attachment to be the standard error without so designating it. The user of the probable error, because he is departing from accepted

procedure, carries the burden of an explanation. In the illustration at issue the observer is well within accepted practice. However, because, as Mr. Luykx points out, there are some readers who could be misled, it might have been desirable for the author to have stated, perhaps in a footnote, that the \pm attachment used was the standard error of the mean.

4. Since Mr. Luykx believes the \pm attachment is usually the probable error and has made his comments on the interpretation of the probable error, in order not to mislead the reader who participates in this controversy I shall continue with the probable error. I accept the comments offered by Mr. Luykx in his third paragraph, stressing, however, that the average of 12.2 days is the *obtained* or *observed* mean. With the *one* probable error attachment the *true* average lies somewhere between 11.1 days and 13.3 days on odds of 1 to 1. On odds of 22 to 1 the true average lies somewhere between 8.9 days and 15.5 days which are the limits set by the obtained mean of 12.2 days and three probable errors [$12.2 \pm 3 (1.1)$].

5. I do not accept the comments offered by Mr. Luykx in his fourth

paragraph. The ± 1.1 days are a constant calculated from the *observed* mean of 12.2 days and should not be used with any of the limits set by this observed mean and its \pm attachments such as to the 8.9 days or the 15.5 days, as if these limits again were *observed* centers or means. The ± 1.1 days belong to the observed mean of 12.2 days. The statement made by Mr. Luykx actually describes the limits set by the observed mean and *six* probable errors [$12.2 \pm 6 (1.1)$]. The error measures are attached to observations. The ± 1.1 days describe the amount of fluctuation inherent in sampling, the amount which by chance alone one can expect the observed mean of 12.2 days to vary.

Sampling errors, preferably *standard* errors should be stated with their observed measures. As long as there is a

remote possibility for confusion it might be desirable to mention whether a \pm attachment is the standard or the probable error with a statement that the *observed* measure and its attachment sets the limits within which by chance the *true* measure will lie. However, I believe, the reading public is becoming sufficiently conscious of sampling and of the use of a \pm attachment as referring to the standard error that a detailed explanation is unnecessary. The uninformed but interested reader will consult the reference for that explanation, thus relieving the observer of the responsibility of incorporating statistics instruction in his article.

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Health Statistics,
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University of Michigan

TO THE EDITOR:

Mr. Luykx appears to dislike the use of the " \pm " notation to indicate the measure of sampling error to be attached to a statistical constant. Except for the fact that this notation is sometimes used for other kinds of errors, this writer sees no objection to it. Certainly it should be clearly indicated what measure of sampling error follows the " \pm ." It is not apparent why one might prefer the standard error (S.E.) to the probable error (P.E.), except that the latter requires the additional step of multiplication by .6745. Since the limit of sampling error is often taken as 2 S.E. (or 3 P.E.), it would be in harmony with this usage to attach this measure.

As Mr. Luykx says, working on the

assumption of a normal sampling distribution, the true value of the corresponding statistical constant of the universe may readily differ from that observed by as much as 3 P.E. in either direction. It does not follow that the constant for another comparable series of observations can differ as readily by 6 P.E. from that observed. Indeed, if another series gave us the same P.E. (as it should *theoretically*) then P.E. of the difference would be $\sqrt{P.E.^2 + P.E.^2}$ or $P.E.\sqrt{2}$ and a difference of 3 P.E. $\sqrt{2}$ or 4.24 P.E. might be adjudged significant.

JOHN W. FERTIG,
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De Lamar Institute of Public
Health, Columbia University

REPORTS OF COMMITTEES

The By-Laws of the American Public Health Association provide that no standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council. Except where specifically noted to the contrary, the following reports are in the nature of progress reports from committees, most of which have had Section approval, but which have not been presented for Governing Council action, and therefore are not to be interpreted as standards approved by the American Public Health Association.

Disinfection of Dishes and Utensils

Engineering Section

YOUR committee on the washing and disinfection of dishes and utensils submits herewith a brief progress report of such work as it has been possible to do under adverse conditions this year.

Last year the committee reported on a survey of dishwashing machines as they were being operated in public eating establishments. The report showed a general lack of uniformity in turning out visually and bacteriologically clean dishes. This was not surprising in view of the observed lack of control of wash and rinse water temperatures, the times of washing and rinsing, and the concentrations of detergent.

Among other things, further study was suggested to determine the optimum ranges of these and other factors that would tend to give more satisfactory efficiency of operation. The data obtained served to emphasize the importance of controlling these important factors within certain limits.

In continuing work this year, the committee planned to develop a standard soiling material consisting of mixed foods that could be applied to standard dishes with a view to having the

percentage removal of such soil indicate the degree of effectiveness of the washing operation. It was desired to make this soil just difficult enough to remove so that the dishes containing it, when properly racked in a good machine functioning as it should with fresh wash water at optimum temperature and containing a fair concentration of a good detergent, would lose the soil in 1 minute.

Using such dishes intended to be uniformly difficult to clean it should be possible, with a machine especially equipped to permit changing temperatures and other factors at will, to study the effect of varying each factor while maintaining the others constant. The amount of soil remaining could be determined approximately by comparison with a set of standard dishes containing fractions of the amount of soil placed on the test dishes.

Such dishes also should serve to show a comparison between the efficiency of various dishwashing machines as operated in public eating establishments. Valuable information also could be obtained by comparing such results with those secured in the same ma-

chines under more favorable operating conditions.

Most of the limited time available this year has been devoted to experimenting with combinations of foods to make a soil to fill this specification and with methods of drying such soils uniformly.

It became apparent that greases could be removed readily by hot water alone as could such substances as egg, milk, and flour unless very thoroughly dried. At first drying was done in an oven at 105° C. for 1 hour.

Tests showed drying to be quite a critical factor. Tests with plates in similar positions, other factors being constant, showed variable results. Considerable work was required to get uniform drying throughout the film on each dish and uniformly on every dish. Oven drying, even with agitation of the air by a fan, did not prove satisfactory. Finally a device was made to introduce a large volume of air heated to about 135° C. tangentially into a cylindrical chamber of slightly larger diameter than the dish to be dried and just below the soiled surface of such inverted dish. Dishes dried in this manner for 2, 4, and 6 minutes respectively showed little variation. A drying time of 4 minutes at this temperature appears to give satisfactorily uniform drying after the soil has dried overnight at room temperature. This is time consuming as each dish must be treated separately.

When the drying factor was variable it was impossible to standardize the soil. With that factor now fixed it should be possible to develop a satisfactory soil in a short time to permit work along the designated lines to be undertaken during the coming year.

The work this year also included some observations of dishwashing machines in operation with a view to determining weaknesses both in construction and operation. Some of the

outstanding points are discussed below.

Most wash tanks are not so designed that all surfaces can be easily cleaned. The immovable superstructure frequently interferes with the operator reaching and viewing the inner surface of the tank. There are sharp angles to hold dirt and obstructions such as tray or belt conveyor angle irons, pipes, and bolts. Particles of putrescing food adhering to the walls of the tank when it is emptied pollute the next batch of wash solution.

The design of pumps also is such that they cannot be cleaned easily and they also contribute to the collection of decaying food solids.

The use of easily disassembled sanitary pipe lines also would improve conditions by making it easier to keep the pipes and jets clean and functioning properly.

A number of instances have been observed in which the hand operated valve controlling the supply of water to the wash tank was leaking badly. These valves often are placed so that the handle projects into the working space where it is bumped by trays or other objects. The wheel handles are broken off and the stems become rounded so that the handle slips, making it difficult to close the valve tightly. The valve seats also corrode. On one machine the valve was in such condition that the operator could not close it and a stream of water ran continually through the wash tank. Under these conditions the detergent added was promptly diluted beyond the point of usefulness. A large quantity of hot water also was wasted. The use of good valves such as stainless steel seated globe valves on these water lines properly placed to protect the handles would improve conditions.

Some washers have revolving spray arms mounted on brass bearings. Sometimes these bearings bind, resulting in poor coverage of the dishes. In

other instances they become so worn that the leakage reduces jet pressure and volume.

The size and area of spray slots and jets vary considerably in different machines. Some jets are as small as $\frac{1}{8}$ in. in diameter or 0.012 sq. in. in area, while at the other extreme some slots are as large as $\frac{3}{4}$ by $\frac{3}{32}$ in. or 0.07 sq. in. in area. Small jets may serve the purpose of building up pressure at the jets but they clog too easily.

In one single-tank machine the fresh water rinse jets were found badly clogged. The dishes although showing an alkaline residue looked fairly clean. The rinse spray jets were cleaned and the dishes came out noticeably dirtier rather than cleaner than before. The explanation is that the greater volume of rinse water from the cleaned rinse jets diluted the detergent to such an extent as to make washing ineffective. It also may have raised the temperature of the wash water above the optimum.

Strainers usually are cumbersome and hard to remove and clean. As a result they often become bent or broken allowing food particles to enter the pump spray lines where they tend to clog the spray jets.

Some single-tank machines depend upon the hot rinse water and sometimes on an auxiliary gas burner to maintain the temperature of the wash water. As jets clog the quantity of rinse water decreases and temperature drops. Auxiliary gas burners generally do not have sufficient capacity to compensate for normal heat losses. In one machine the

operation of the wash sprays for 1 minute caused a drop in temperature of wash water of 5° F.

This is simply a cross-section of some of the weak points of dishwashing machines that have been observed.

With this summary of the work and observations of the year we suggest the continuation of these investigations and make the following recommendations which are in accord with those made last year:

1. That minimum satisfactory time intervals for washing and for rinsing under fixed operating conditions be determined and that as soon as practical new machines be built to insure such periods.
2. That optimum temperature ranges for washing and for rinsing be determined and when feasible new machines be equipped to maintain such temperature automatically.
3. That new machines be designed to prevent excessive dilution of the detergent in the wash water and more satisfactory methods be devised for maintaining the concentration of detergent.
4. That more attention be given to sanitary construction and ease of disassembling machines for cleaning.
5. That further studies be made along the lines herein suggested to determine if possible just what dishwashing machines are accomplishing or failing to accomplish in the cleaning of soiled dishes.

The committee wishes to acknowledge the active assistance of Clarence W. Weber in testing and observing equipment.

W. D. TIEDEMAN, M.C.E., *Chairman*
J. D. CALDWELL
F. CLARKE DUGAN, C.E.
A. W. FUCHS, C.E.
WILLIAM T. INGRAM

Microbiological Examination of Spices, Fermented Foods, and Fruit Juices*

Food and Nutrition Section

THE committee has continued the program of bringing together each year a few practical methods for the examination of foods with a view to compiling eventually enough material for a publication on Standard Methods for the Microbiological Examination of Foods.

Microbiological Examination of Spices

The bacteriological examination of spices is important since they are used as ingredients in many types of prepared foods. It is known that most types of spices are very high in bacterial count¹ and thus may contribute to the spoilage of the food products in which they are used, as for example, in such products as meats of low process such as luncheon meats, sausages, etc.² It is because of the importance of such spoilage problems that the committee believes that a standard method for the bacteriological examination of spices should be proposed.

Spices may be divided into "whole spices," such as allspice, cloves, cinnamon sticks, etc.; "ground spices," such as pepper, coriander, ground cloves, etc.; and spices of bulky nature such as bay leaves, herbs, sage, etc.

METHOD

Sampling—Take a 50 gm. sample from each of three containers and pack carefully in glass jars to prevent loss of oil, and send to laboratory.

Preparation of Samples for Culturing—Weigh spices on sterile paper or directly into the dilution flask in a dust-free room or

cabinet. Due to differences in bacterial counts, bulk and character the following amounts of spices are recommended:

| | |
|---------------|--------|
| Whole spices | 10 gm. |
| Bulky spices | 2 gm. |
| Ground spices | 1 gm. |

Add sterile water to spice to 100 ml. mark and shake vigorously for 5 minutes. Allow coarse material to settle out and use appropriate dilutions in various media.

Making Bacterial Counts—Counts should be expressed as numbers of bacteria, molds, spores, etc., per gm. of spice.

a. Total bacterial count:

Use either nutrient agar (Difco) or Brom-Cresol Purple-tryptone-glucose agar (Difco) and incubate for 48 hours at 37° C. and 55° C.

b. Acid-tolerant bacteria and molds:

Use wort agar (Difco) and incubate at 25° C. or room temperature for 5 days.

A special agar of the following formula may be used for the detection of *B. thermacidurans*:

| | |
|---------------------------------|-------|
| I. Proteose peptone | 5 gm. |
| Yeast extract | 5 gm. |
| Glucose | 5 gm. |
| K ₂ HPO ₄ | 4 gm. |

Dissolve above ingredients in 500 ml. of distilled water and adjust to pH 5.0 and autoclave.

* Report of the Committee on Microbiological Examination of Foods.

II. To another 500 ml. of distilled water add 20 gm. of agar and autoclave.

Mix the contents of flasks I and II just prior to use.

Incubate plates at 37° C. and 55° C. for 2 days.

Detection of Spores—Boil spice suspensions for 5 minutes and make up loss due to evaporation with sterile water. Plate appropriate dilutions using: (A). Brom-cresol purple-tryptone-glucose agar and incubate at 37° C. and 55° C. for 2 days. Report total spore count, flat sour spore count and non-flat sour spore count; (B) For the detection of spores of aerobic gas producing bacteria use Jensen's medium* and incubate at 37° C. or 48.9° C. for 5 days. (More rapid gas production will be obtained at the higher temperature.)

Anaerobes

a. For putrefactive anaerobes use liver broth medium⁴ stratified with agar and incubate at 37° C. for 5 days;

* Jensen's Medium: Fill culture tubes half full with finely ground or chopped spiced ham (from a sound can) and wet down with solution made of 0.4 per cent sodium nitrate and 2 per cent sucrose. Autoclave at 15 lbs. pressure for 15 minutes.

NOTE: (a) No trapped bubbles of air should appear in the medium. (b) Medium should be covered with at least $\frac{1}{4}$ in. of water. (c) Tubes should not be more than half filled.

b. For thermophilic anaerobes not producing H₂S use liver broth medium⁴ stratified with agar and incubate at 55° C. for 48 hours. The liver broth should be freshly exhausted prior to use.

c. For thermophilic anaerobes producing H₂S use the following medium (a modification of 5):

| | |
|---------------------------------|-----------|
| Tryptone, Difco | 10 gm. |
| Na ₂ SO ₄ | 1 gm. |
| Agar | 20 gm. |
| Water | 1,000 ml. |

After the above ingredients have been dissolved by boiling, add 10 ml. of a 5 per cent solution of ferric citrate. Tube in 10 ml. amounts and autoclave at 15 lbs. pressure for 30 minutes. Use appropriate dilutions of spice and incubate at 55° C. for 48 hours.

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Microbiological Examination of Fermented Foods

There are a number of different types of fermented foods which might be considered under this heading. The methods to be discussed in this section do not deal with dry products which have undergone fermentation during preparation, such as coffee, tea, cocoa, etc., nor with fermented beverages such as beers, wines, etc. Rather they apply to fermented products such as sauerkraut, pickles, olives, and okra either as raw or as processed products. Of these, sauerkraut is the only one which is not materially changed after the fermentation process, that is, by sweetening, spicing, or similar pickling change.

Sauerkraut is normally sold as a processed food or as a raw product. It

may be abnormal in several ways some of which may lead to an abnormal microbial flora. Usually such conditions are caused by faulty salting or improper temperature of fermentation, and may cause an improper acid development. With this in mind it seems essential that after superficial examination of the food, analysis for total acidity and salt should be made.

The more common undesirable microbial changes occurring in fermented foods are due to yeasts. Since excessive numbers of yeast cells, mold hypha, or Gram-negative rods are indicative of an abnormal condition, a microscopic examination of a Gram-stained preparation is desirable.

The direct microscopic method

(*Standard Methods of Milk Analysis*, 8th Ed., 1941, pp. 40-53) should be used. Brine from the product should be mixed, and a 0.01 ml. sample spread over a 1 sq. cm. area. After drying, the preparation is fixed with heat and stained with Gram's stain. A high count of Gram-positive rods and cocci should be expected and is desirable, since they are the bacteria responsible for a normal fermentation. A high yeast count or presence of mold hypha is indication of faulty conditions such as excess salting, exposure to contamination from the air, or drying of the surface.

The total plate count has little significance in indicating the condition of raw kraut. It is used primarily for isolation of organisms from the kraut but it may also be used to study the types of colonies developing upon the plate.

Processed kraut or pickles sometimes may be given too little process or may become recontaminated. Plating may be used to demonstrate this contamination.

Processed sauerkraut or pickles should contain no microorganisms. The raw products will contain large numbers of organisms, the colonies being small, gray white, round, 1-3 mm., or lens-shaped subsurface colonies or

larger, 3 mm. surface colonies. The presence of larger white or cream-colored colonies or smaller colored colonies indicates an abnormal product.

PLATING METHODS

All equipment (pipettes, dilution bottles, Petri dishes, hot air ovens, autoclaves, thermometers, incubator, water, peptone, agar, and sugar) used for bacteriological examination of juice should meet the specifications of the A.P.H.A. *Standard Methods of Milk Analysis* (8th Ed., 1941, pp. 16-22). Yeast*

| | Per cent |
|---|----------|
| Agar, best quality, granulated or shred | 1.5 |
| Yeast extract, Bacto or equivalent | 0.3 |
| Tryptone, Bacto or equivalent | 0.5 |
| Glucose | 0.1 |
| Water, distilled | |
| Adjust reaction to pH 6.6 to 7.0 | |
| Sterilize in an autoclave | |

extract should be used rather than beef extract.

Plating—Melt the agar in an autoclave, in flowing steam, or in boiling water. Cool to 41-42° C. and hold at this temperature until ready to pour into Petri plates.

The juice of the fermented product should be mixed thoroughly, especially from top to bottom.

For processed food prepare Petri plates in duplicate containing 1 ml. and 0.1 ml. of juice.

For raw products plate at dilutions of 1:10,000 up to 1:1,000,000. Pour approximately 10 ml. of agar in each plate and mix by rotating gently. Cool, invert plates and incubate at 32° C. for 48 hours.

* Use tryptone-glucose-yeast extract agar of the following composition:

Microbiological Examination of Fruit Juices

The processing of fruit juices is a relatively new industry in many ways but one which will require close supervision in order to control the quality of the products. Control of quality is essentially a control of cleanliness and handling of the food in the plant.

METHOD

The agar plate method of examination of fruit juices may be an aid in determining the quality. The method for estimating microorganisms consists of counting the microbial

colonies or growths which develop upon a nutrient agar plate after mixing and incubating a suitable dilution of the juice. The colonies are counted after incubating for 72 hours at 32° C.

All equipment (pipettes, dilution bottles, Petri dishes, hot air ovens, autoclaves, thermometers, incubator, water, peptone, agar, and sugar) used for bacteriological examination of juice should meet the specifications of the A.P.H.A. *Standard Methods for the Examination of Dairy Products* (8th Ed., 1941, pp. 16-22). Yeast extract should be used rather than beef extract.

Use tryptone-glucose-yeast extract agar of

the composition given under fermented foods and/or a more acid medium as suggested for *B. thermoacidurans*.

Plating—Melt the agar in an autoclave, in flowing steam, or in boiling water. Cool to 41–42° C. and hold at this temperature until ready to pour into Petri plates.

From the viewpoint of method of examination and of interpretation of results, fruit juices should be considered as of three types:

(A) Pasteurized, (B) raw, and (C) frozen or cool storage.

Pasteurized juices should be relatively free of microorganisms.

Before opening, examine the container, the contents of the container, as well as the closure for signs of fermentation or mold growth. Abnormal cans may show loss of vacuum or even hydrogen swells. Bottle caps may bulge due to fermentation.

Mix the contents by inverting several times.

Open bottles while passing a flame over the cap.

Open cans after burning alcohol over the top.

With a pipette delivering 1.1 ml., prepare in duplicate, Petri plates containing 1 ml. and 0.1 ml. of juice.

Pour approximately 10 ml. of agar in each plate and mix by rotating gently. Cool, invert plates, and incubate at 25° C. for 72 hours.

Raw juices will always have much higher counts of microorganisms.

Observe juice for fermentation or for mold growth.

Mix the contents by inverting if in bottles, or by stirring if in larger containers.

Prepare dilutions from 1:100 up to 1:10,000 in duplicate in Petri plates. Pour agar, rotate, cool, and incubate as directed above.

Frozen or cool storage juice when freshly packed might be considered as raw juice. During storage certain types of microorganisms die, while others accustom themselves to low temperatures.

Examine the surface of the juice for mold growth. Thaw and mix the juice immediately. Plate at dilutions of 1:100 to 1:10,000. Pour agar, rotate plates, cool, and incubate at 21° C. for 5 days. Better results will be obtained at this temperature on frozen and cool stored juices. Examine after 2 days and 3 days, and count the plate if it becomes apparent that mold or spreading bacterial colonies may spread over the plate.

INTERPRETATION OF RESULTS

Counts on pasteurized juices must necessarily be low in order to insure keeping quality, but spore-forming bacteria and mold spores often survive pasteurization, especially if the products have not been handled properly. Plate counts up to 5 per ml. may be expected. Mold or bacterial colonies in excess of 10 indicate faulty washing of fruit and cleaning of equipment, or inadequate processing.

In raw juices the total number of organisms is an indication of the cleanliness of equipment as well as the age of the juice. Total counts in excess of 100,000 per ml. may indicate growth during the handling of fruits. High mold or bacterial counts are indicative of poorly cleaned equipment. A high yeast count is an indication of fermentation.

Frozen products are similar to raw juices, although a reduction in count should follow prolonged storage. An excessive yeast count may indicate growth of yeast during a slow freezing operation. Occasionally mold growth or yeast growth may take place during cool storage if the temperature rises somewhat.

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A New Method for Measuring the Quality of Urban Housing

A Technic of the Committee on the Hygiene of Housing *

THREE years ago the committee undertook to develop a method of measuring the quality of housing in urban slums. The direct stimulus for the committee's work in this field of appraisal was a number of requests from public health officials that we translate the substance of our "Basic Principles of Healthful Housing" into a yardstick of housing deficiencies, as a basis for enforcement work in problem areas. Although other survey procedures have been developed for city-wide application—such as the standard real property inventories and the 1940 Housing Census—more intensive methods are clearly needed for limited areas which are known to be generally substandard or of marginal quality.

The dramatic slums of any community are likely to be well known in a general way, but this is not enough. Effective programs of control (or post-war rehousing on the scale generally anticipated) will require closer definition and measurement of substandard housing than is possible with present appraisal methods. Such definition and measurement is needed both to delimit the problem areas, to evaluate their deficiencies, and to indicate whether a solution lies in the direction of law-enforcement, demolition and rehousing, or ultimate conversion from residence to

other uses. The standard city-wide survey technics are not designed to provide this type of information.

Although relatively close measurement is needed, this does not mean a researcher's type of survey, turning out bushels of tabulations and acres of maps on every aspect of the problem that might conceivably be of interest to other research workers; rather it means an administrator's inventory, producing only the data needed for policy-making and concrete action—and these data in concise graphic form that will command the attention of already overburdened public officials.

The committee believes that appraisals of a type which will answer basic questions of housing policy can be made by the permanent inspection staffs of health departments and other city agencies concerned with housing. If so, the procurement and interpretation of essential housing data can become a regular function of city governments rather than a job to be done at those rare intervals when special research funds and personnel may be available.

American cities devote thousands of man-days every year to housing inspection service in their slums, but it is a rare community in which this effort provides usable answers to the questions on which a long-term housing program must be built. Such questions, for example, as: Just what is the size and nature of the extreme slum areas? How much worse is district A than dis-

* Adapted from a paper presented for the committee by Allan A. Twichell, Technical Secretary, at the Seventy-first Annual Meeting of the American Public Health Association, St. Louis, Mo., October 28, 1942.

trict B, and in what respects? How many dwellings should be designated unfit for habitation, and either demolished or rehabilitated? Aside from the condition of dwellings, are the problem areas, as neighborhoods, fit to live in?

An experienced city manager has recently pointed out some of the chief reasons why traditional methods of housing inspection fail to supply the needed answers.¹ He cited the common practice of inspecting only on complaints, the waste of effort through unnecessarily overlapping inspections, and the absence of an official minimum dwelling standard to which both enforcement and rehousing programs might be related. Other limitations can be added. Forms and records are seldom designed to be useful or understandable to others than the inspection agency. There is usually no central clearing-point for essential housing data. Often too little thought is given to summarizing inspection findings as a measure of the total problem in areas which are large enough to be significant for planning.

The Committee on the Hygiene of Housing has sought to overcome these limitations in its method of inspection and evaluation. This method has been developed and tested by a Subcommittee on Appraisal of Residential Areas, under the leadership of Rollo H. Britten of the U. S. Public Health Service.* The principal test surveys have been made in New Haven, Waterbury, and Stamford, Conn., in coöperation with public health, housing, and city planning agencies of these cities, and with both technical and financial help from the Connecticut Department of Health. The object of the following

discussion is to describe the appraisal method thus developed, to illustrate the type of results it will produce, and to sketch its implications for local housing policy.

THE COMMITTEE'S APPRAISAL TECHNIC

The central purpose of the committee's method is to make it possible, by assigning a part of inspectorial energies to the systematic appraisal of known problem areas, to measure the quality of housing in a way which will serve the policy-making purposes of all local agencies concerned with housing. The principal features of the technic are as follows:

1. It reports and evaluates housing deficiencies which may adversely affect health, safety, or essential livability.

Factors covered for dwellings include water supply, sewage disposal, toilet and bathing facilities, condition of repair, safety of egress, adequacy of daylight, type and distribution of heating facilities, sanitary condition of the premises, completeness of landlord services in multiple dwellings, room sizes, overcrowding, rent, family size and composition, and family income. In presenting the results, distinction is made between relatively fixed physical conditions and the changeable factors of occupancy and maintenance, since remedial action must recognize these characteristics.

2. The neighborhood environment, largely ignored in previous survey methods, is recognized as an essential element in housing adequacy.

Neighborhood criteria include crowding of land by buildings, industrial and commercial uses intermixed with residence, hazards associated with streets and nearby railroads, adequacy of public utilities, and availability of essential community services: schools, transportation, parks and playgrounds.

3. The quality of housing is measured by a tested system of numerical scores.

Scores are expressed in terms of the dwelling conditions, neighborhood characteristics and these two combined. Instant comparisons of quality are thus made possible as between blocks or groups of blocks, individual dwell-

* Other personnel of the subcommittee: Frederick J. Adams, F. Stuart Chapin, Andrée Emery, Alfred H. Fletcher, L. M. Graves, M.D., Maynard W. Meyer, Robert B. Mitchell, M. Allen Pond, Allan A. Twichell, Secretary, Anatole Solow, Research Associate.

ings, types of dwellings, or other wanted categories.

4. Clear, well designed forms are provided for data collection. Systematic procedures for analysis and graphic presentation of the significant findings are an integral part of the technic.

Items calling for subjective judgment by the inspector have been replaced by those of an objective, measurable type which will give consistent results from different enumerators. Sampling is used when this is appropriate to the purposes intended.

5. The method is suitable for execution by the regular personnel of city departments, after brief instruction.

The appraisal of dwelling conditions is particularly adapted for execution by the inspection and clerical staffs of local health or building departments. The survey of neighborhood characteristics can be made by the staff of an active city plan commission, or under the direction of a sanitary engineer or the technical director of a housing authority. Either the dwelling appraisal or that of the environment can be made alone, but the soundest results are obtained when both are made, for only the combined results give a true picture of the total housing problem.

The scoring system is the distinctive feature of the method, and lies at the heart of its effectiveness. The obvious value of a scoring system is that it *measures* total quality and expresses this measurement by a convenient index figure. There is almost no kind of analysis of housing data which is not tremendously facilitated by the use of scores. But the scoring system must be sound. Much of the committee's work during the period of development has gone into tests of the scoring method. This testing has convinced the committee and numerous outside critics that the present rating scales are accurate differentiators of housing quality.

The scores consist of penalty points assigned to conditions which fall below reasonable standards. These standards,

largely derived from the "Basic Principles of Healthful Housing," have been checked with local officials as to their reasonableness for enforcement or other official purposes. Scoring is done from the completed schedules in the office rather than in the field, for it is believed that the enumerator should report conditions only, and should not complicate either his work or his attitudes by the assignment of ratings. While the standard rating scale is believed applicable in most particulars to any American city, it can easily be modified to fit local or regional conditions, since the rating forms have been developed separately from the enumeration schedules.

The recommended rating scale provides penalties for various deficiencies ranging from 1 to 30 points, depending on the seriousness of the conditions as a threat to health, safety, or essential livability. "Basic Deficiencies"—conditions any one of which may make a dwelling substandard for enforcement or rehousing purposes, such as totally inadequate fire-escapes or the absence of inside toilets—are counted separately as a kind of auxiliary score.

Under this scheme, dwellings and neighborhoods which are essentially up to standard will show penalty scores of 0 points. Extreme slum sections in the cities of our test surveys have incurred total dwelling penalties of 200 points or more per dwelling unit, with characteristic total scores for the neighborhood environment running around 125 penalty points per block or street frontage.²

A JOINT STUDY TO SHAPE OFFICIAL POLICY

The technic was originally intended for execution by local health departments. It soon became evident, however, that such a method could serve the needs of other bodies too, and that it would be most valuable when car-

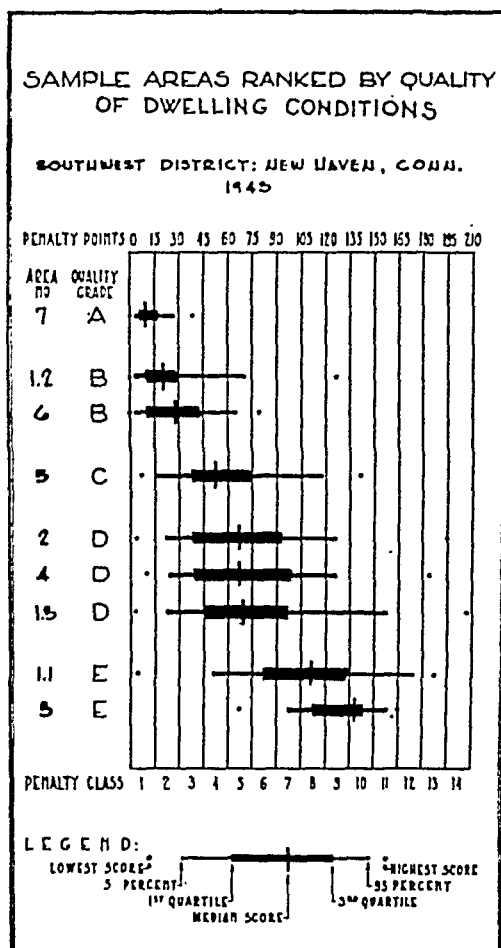
ried out jointly by a group of local agencies. This coöperative approach is well illustrated in the most recent demonstration survey, now being concluded in the Southwest District of New Haven, Conn.

This district takes in about one-fifth of the city's developed area and houses 42,000 of its 160,000 persons. It includes extreme slums, areas of problematic quality, and fringes of clearly self-sustaining neighborhoods. The health, building, and fire departments recognize the district as one of excessive inspection and enforcement burdens. The housing authority desires to find sites there for post-war housing projects. The city plan commission has undertaken a replanning study of the district, and wishes also to delimit clearance areas for enlargement of a terminal market and warehouse district. And the social agencies are wondering whether the housing future of the district will warrant investment in certain additional community center facilities.

In this area of diversified problems a joint appraisal has been sponsored and conducted by the committee and five governmental agencies: the local Health Department, City Plan Commission, and Housing Authority; the State Health Department; and the U.S. Public Health Service. The purpose of the study is to lay the groundwork for a coöordinated long-term program of housing enforcement, replanning and reconstruction for the district. Personnel or funds were supplied by each of the sponsors, and the work has been directed by the committee's staff. The interests of the several sponsors and their responsibilities have been set forth in a formal working agreement. It is thought by the partners in the undertaking that this "memorandum of understanding" may provide a pattern for a most fruitful type of joint attack on local housing problems.

After a preliminary screening study

FIGURE 1



of the 1940 Housing Census data, seven sample areas totaling 35 blocks were selected for appraisal.* These groups of blocks were chosen to represent the range from thoroughgoing slums to neighborhoods clearly free from serious housing problems. Fifty per cent of the 2,500 dwelling units in these blocks were inspected, and 30 of the blocks were completely surveyed for environmental characteristics. The accompanying figures give some highlights of the findings.

Figure 1 shows the quality of dwelling conditions (excluding environmental

* For purposes of analysis sample area 1 was later subdivided into three sub-areas (1.1, 1.2, 1.3), giving the nine areas of Figure 1.

characteristics) in the sample areas, and illustrates how the technic measures the range of over-all conditions from one area to another.

At the top of the figure is indicated the range of total penalty scores incurred by all dwelling units—from 0 to 208 points. This range is divided into penalty classes of 15 points each, as shown at the bottom of the chart. Units with total penalty scores of less than 15 points fall in penalty class 1; those with penalties of 140 points in class 10, and so on. The solid horizontal bar for each sample area represents the range of scores for 90 per cent of its dwelling units, and the scatter of 5 per cent of the cases at either end of the scale is shown by a terminal dot. The score of the median dwelling unit for each sample area is shown by a vertical bar; scores at the first and third quartiles are shown by breaks in width of the horizontal bar.

Thus, for example, the highest grade sample area (No. 7 at the top of the chart) shows a range of penalty scores from 0 to 38 points, but its median dwelling unit has a score of only 10 points. Fifty per cent of the units (from first to third quartile) show total penalties between 6 and 17 points; 90 per cent have scores between 2 and 28 points.

The chart reveals the relative quality of the sample areas at a glance. Two extremely poor areas show at the bottom of the figure; one quite good and two fairly good ones appear at the top, with four of distinctly worse quality between. These areas have been classified into five quality grades, from A to E (as given at the left of the chart), according to the penalty class and the number of basic deficiencies shown by the median dwelling unit for each area.

As a generalization for the present study, we may take the break between grades C and D as a rough dividing line between areas of more or less passable dwellings and those in which general corrective action by city departments will be needed. Over fifty per cent of the dwelling units in grade

D areas are substandard in the sense that they show one or more basic deficiencies as defined by the local sponsors. In the less bad of the two grade E areas, 94 per cent of the units have one or more basic deficiencies and 31 per cent show four or more. Further analysis indicates that grade E areas are clearly beyond acceptable rehabilitation of their present housing on any economic basis, and that housing of grade D is full of problems for the agencies charged with enforcement or rehousing.

Some of these problems are indicated in Figure 2. This gives the distribution of salient housing deficiencies, for the sample areas grouped by quality grade. Thus, while Figure 1 *measures* the range of the problem, Figure 2 *describes* the problem in various parts of the range. Here selected environmental factors have been included with the dwelling characteristics.

Although room crowding is not the chief difficulty of this district, a considerable problem of overcrowding abatement is indicated by items 21 and 22 of Figure 2. Areas of grades D and E show from 42 to 69 per cent of their dwelling units with physical defects which usually cannot be remedied without expensive or impracticable structural changes (items 8, 9, and 13). Over one-third show extreme disrepair (item 18), serious daylight obstruction by adjacent structures (item 5), and inadequate room sizes (item 15), the latter two at least being usually curable only by demolition. Separate analysis of D and E grade areas, of course, shows considerably higher deficiency rates in the latter than the figures given here.

Environmental characteristics shed additional light on the difficulty of rehabilitating such low-grade areas to meet contemporary housing standards. Fifty-eight per cent of the street frontages in grades D and E have a very

FIGURE 2

Selected Deficiencies of Dwellings and Neighborhood Environment
Sample Areas Grouped by Quality Grade
Southwest District, New Haven, Conn.

| Scoring Item Number | Deficiency | Qualifying Range of Score: Penalty Points ¹ | Quality Grade of Sample Area | | |
|------------------------------|--|--|--|----|---------------------|
| | | | A and B Combined | C | D and E Combined |
| | | | Per cent of Dwelling Units Incurring Penalty Scores within the Qualifying Range (preceding column) | | |
| FACILITIES | | | | | |
| I. DWELLINGS | | | | | |
| 2 | Public Hall Daylight: Grossly Inadequate ² . . | 5-10 | 0 | 0 | 10 |
| 5 | Daylight Obstruction by Adjacent Structures: Serious ² | 5-15 | 18 | 28 | 44 |
| 8 | Piped Water: Cold Only or None in Unit . . . | 7-15 | 4 | 20 | 42 |
| 9 | Bathing Facilities: None, Shared, or No Hot Water | 7-23 | 6 | 22 | 44 |
| 10 | Toilet Facilities: Shared, Outside Unit, or Non-flush | 10-40 | 2 | 1 | 9 |
| 12 | Windowless Rooms: One or More | 15-20 | 0 | 0 | 6 |
| 13 | Installed Heating: None in at Least One-half of Rooms | 10-18 | 7 | 60 | 64 |
| 15 | Room Sizes: Area of One or More Rooms Substandard ² | 5-10 | 19 | 17 | 37 |
| MAINTENANCE | | | | | |
| 16 | Yard Condition: Grossly Insanitary ² | 10-15 | 0 | 15 | 26 |
| 18 | Structural Deterioration: Extreme ² | 20-30 | 3 | 15 | 37 |
| OCCUPANCY | | | | | |
| 21 | Persons per Room: One and One-half or More | 10-25 | 10 | 18 | 22 |
| 22 | Area per Person: Substandard ² | 10-25 | 1 | 4 | 13 |
| | | | Per cent of Blocks or Street Frontages Incurring Penalty Scores within the Qualifying Range | | |
| II. NEIGHBORHOOD ENVIRONMENT | | | | | |
| E 1 | Land Coverage by Buildings: Excessive ² . . . | 10-24 | 0 | 10 | 17 |
| E 5 | Land Use: 30 Per cent or More of Block Area in Industrial, Commercial or Mixed Resi- dential Use | 10-13 | 2 | 38 | 58 |
| E 7 | Specific Nuisances and Hazards from Non- residential Sources: High Incidence ² | 18-30 | 6 | 21 | 44 |
| E 8 | Moral Hazards: Considerable in the Area ² . . | 6-10 | 0 | 15 | 24 |
| E 10 | Hazards and Nuisances from Adjacent Streets: Considerable ² | 15-20 | 2 | 26 | 25 |
| E 21 | Public Playgrounds: Beyond Reasonable Dis- tance ² | 8 | 4 | 44 | 69 |

1. For most of the deficiencies the range of possible scores begins with 1 or 2 penalty points. In order to show here only the really significant defects, those dwellings or street frontages with slight penalties for any item have been excluded.
2. Space limitations preclude an accurate statement here of the criteria on which this item is scored. As noted in the text, all deficiencies are reported in terms of objective characteristics, not in such loosely descriptive terms as are necessary here. Scoring is done from precise rating tables.
3. Applicable only to tenements with public halls.

high concentration of industrial or commercial uses (item E5), typical of downtown slum districts. This problem is emphasized by the almost equally high percentage showing severe degrees of specific nuisances (E7) such as noise, vibration, conflagration hazard, odor,

and smoke associated with non-residential uses. Public playgrounds within normal walking distance (E22) are lacking for over two-thirds of the blocks in grades D and E. Crowding of the land by buildings (E1) is not so serious here as will be found in many slums,

but the prevalence of street hazards (E10) is the earmark of a district so cut up by traffic arteries as to be unsuitable for housing without replanning the traffic pattern.

Figures 3 and 4 give the characteristics of a typical dwelling in a grade E area. In Figure 4 is used the rating form prepared in the office for each dwelling unit, which shows the specific judgments for individual dwellings made possible by the technic, in addition to general evaluation of areas. The dwelling whose photograph and score are given here is the median case for Area 1.1, and is thus both better than half and worse than half of the others in this group of blocks. This dwelling unit is on the second floor rear of the building pictured. The three basic deficiencies of this unit and its structure are: lack of exterior or incombustible means of egress available to all dwelling units; disrepair of floors and plaster amounting to a definite safety hazard; and a family size which, in relation to both the number and substandard size of the rooms, causes excessive crowding. Additional defects include serious obstruction of daylight by neighboring structures, a bath tub rendered largely meaningless by lack of piped hot water, and stove heating for only two of the five rooms. It is clear that slum conditions are not restricted to the shared toilet, overcrowding, and the lack of repair which provided the grist for the hopper of old-line housing literature.

In these D and E grade areas, then, we have a sketch portrait of thorough-going slums, many of which should be cleared out as soon as possible, and which meanwhile call for correction orders and systematic reinspection. Even archaic law is clearly violated by many of the conditions brought to light. At least the eight blocks comprising the grade E areas of the present study are definite candidates for demolition, since they show considerably higher



FIGURE 3—Typical Dwelling of a Grade E Area

penalty scores and a wider spread of basic deficiencies than a block in another part of the city which was cleared and rebuilt by the local housing authority because of the impossibility of rehabilitating it.

But what is the extent of these slums in the Southwest District as a whole? What proportion of the families live, for instance, under the conditions implied by grades D and E? How large are the areas which appear ripe for slum clearance? Where is drastic housing enforcement indicated? Where are the mild problem areas in which blight can perhaps be stopped and rehabilitation encouraged? The accompanying map (Figure 5) makes it possible to begin answering questions of this type, and these answers can be refined as necessary by further analysis of the appraisal data.

This map classifies all blocks in the Southwest District by quality grade of dwelling conditions as discussed above, with grades D-E and A-B combined for the sake of simplicity. The blocks of the sample areas are shown in heavy outline. For these the quality grades are definitive findings of the coöperative survey. The remaining areas have been

FIGURE 4

Coöperative Housing Survey of Southwest District, New Haven
Dwelling Unit Rating Form and Summary of Field Schedule
Appraisal Technic of the Committee on the Hygiene of Housing, A.P.H.A.

Area 1.1

Address XX York St.

Block 3

Unit Serial Number 452

I. DESCRIPTION

Struc. Type 6 Fam.

W. Bus. No

No. Stories 3

Occupancy Tenant

White X

Non-White

No. Rms. in Unit 5

Monthly Rent Class \$20-25

No. Pers. in Hsehd. 7

Yrly. Income \$1500-2000

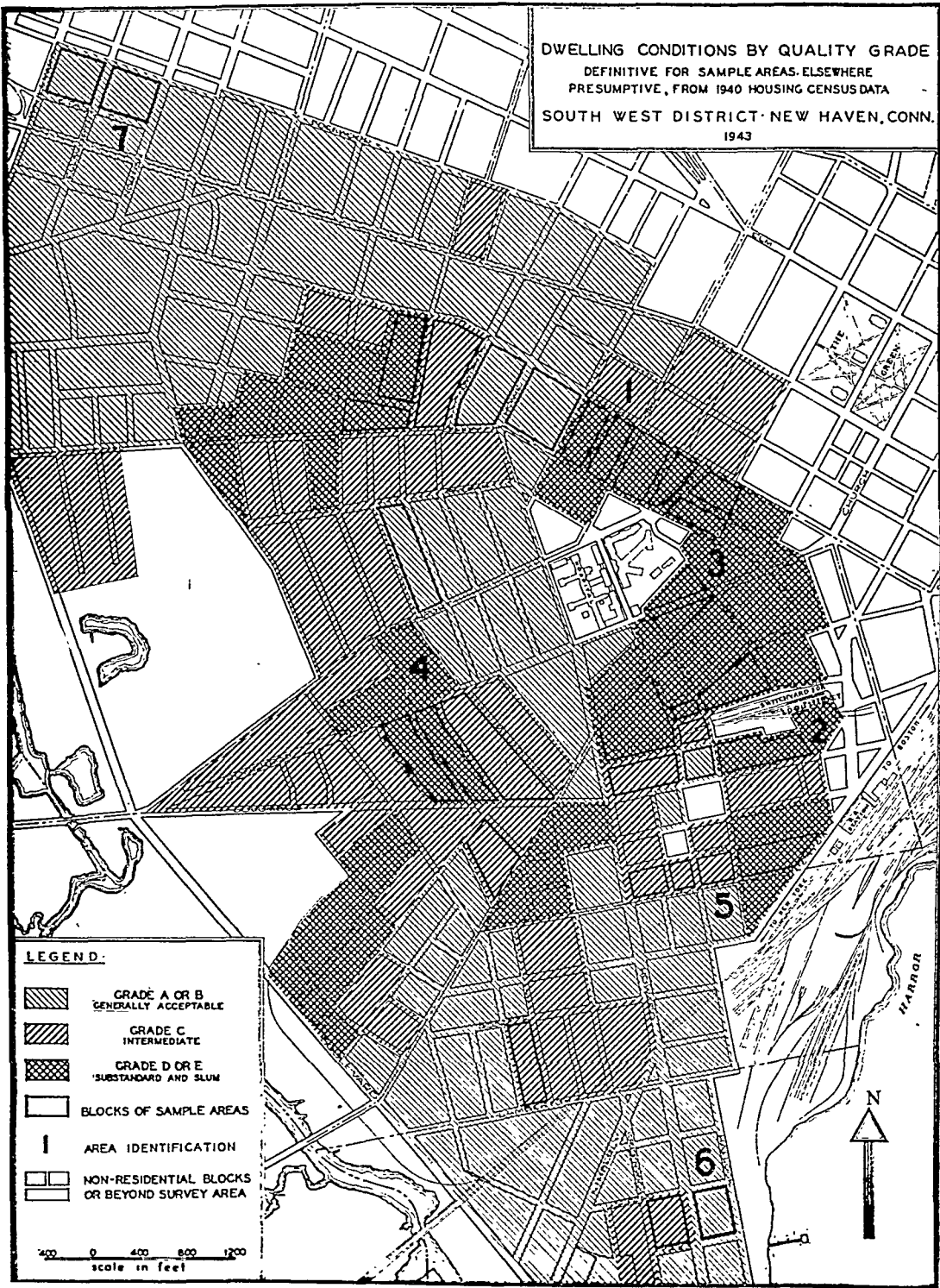
II. PENALTY SCORES AND BASIC DEFICIENCIES

| TYPE OF DEFICIENCY | PENALTY SCORE: POINTS | | BASIC DEFIC. |
|--|-----------------------|------------|--------------|
| | POSS. RANGE | THIS D. U. | |
| A. FACILITIES | | | |
| Structure | | | |
| 1. Means of Egress | 2-30 | 14 | ✓ |
| 2. Public Hall Daylight | 2-10 | -- | |
| 3. Building Frontage | 2, 3 | -- | |
| 4. Sewage Disposal | 4-30 | -- | -- |
| 5. Daylight Obstruction | 2-15 | 8 | |
| Dwelling Unit | | | |
| 6. Unit Location | 3, 7 | -- | |
| 7. Artificial Lighting | 10, 15 | -- | -- |
| 8. Piped Water | 7-15 | 7 | -- |
| 9. Bathing Facilities | 3-23 | 10 | -- |
| 10. Toilet Facilities | 4-40 | -- | -- |
| 11. Kitchen-Laundering Facilities | 2-15 | 3 | -- |
| 12. Windowless Rooms | 15, 20 | -- | -- |
| 13. Installed Heating | 2-18 | 11 | -- |
| 14. Closets | 2-10 | 2 | |
| 15. Room Sizes | 2-10 | 5 | |
| Subtotal a: Facilities..... | | 60 | |
| B. MAINTENANCE | | | |
| Structure | | | |
| 16. Sanitation of Premises | 1-15 | -- | |
| 17. Landlord Services | 2-12 | 5 | |
| 18. Structural Deterioration | 1-30 | 10 | -- |
| Dwelling Unit | | | |
| 19. Toilet Condition | 10 | -- | |
| 20. Structural Deterioration | 2-30 | 20 | ✓ |
| Subtotal b: Maintenance..... | | 35 | |
| C. OCCUPANCY: D.U. | | | |
| 21. Room Crowding | 2-25 | 8 | ✓ |
| 22. Area Crowding | 2-25 | 13 | -- |
| 23. Family Doubling | 7, 10 | -- | |
| Subtotal c: Occupancy..... | | 21 | |
| TOTAL | | 116 | 3 |
| 24. Other Defic. Reported by Occupant. Not Scored. <input checked="" type="checkbox"/> | | | |

provisionally classified by scoring the 1940 Housing Census data for these blocks, using a rating scheme based on that of the committee's technic.

Under this scheme, the Census data for blocks of the sample areas were first compared with the survey findings; penalty scores were then assigned for the three most diagnostic items of the Census to give a

FIGURE 5



basis for computing presumptive quality grades. When the scoring formula had been refined so as to produce substantial agreement between the grading obtained from the Census data and the grading of the complete appraisal method, classification by presumptive quality grades was extended to the remaining blocks of the district. The map gives the result of this process, slightly generalized for legibility at a reduced scale. While the validity of such use of the Census data must be further tested in other cities before it can be recommended for general use, it is clear that for this section of New Haven this rapid method of projecting the survey findings is accurate for broad policy-making purposes. Projection of the environmental appraisal throughout the district by an index method would be desirable to refine the map, but since close agreement has been found in this particular section between the quality of dwellings and that of the environment, the present map can be taken as a reasonable approximation of the combined appraisal. This would definitely not be true in many other places.*

One large and several smaller concentrations of presumptive D and E grade housing appear as the core of the problem. These are connected by continuous belts of C grade blocks. The areas mapped as grades D and E account for 3,200 dwelling units, or 25 per cent of those in the Southwest District. Obviously not all dwellings in this group will warrant clearance or even drastic remedial action, but on the other hand a considerable number of the blocks provisionally classified from the Census data as grade C (accounting for another 28 per cent of the dwellings) can be expected to show marked concentra-

tions of grade D or E conditions when further analyzed. Therefore 3,000 families seems reasonable as a preliminary figure for the number of families in the district needing correction of their housing conditions by official action, whether this be mandatory improvement of existing dwellings or slum clearance and reconstruction.

The encroachment of grade C blocks into higher grade areas indicates a spreading of blight which local agencies will wish to check, both as a protection to the remaining unspoiled neighborhoods and as a safeguard to the city's tax base.

Local agencies are now planning to extend the appraisal throughout the city, with the purpose of delimiting all problem areas and of analyzing these areas as necessary with the committee's full appraisal technic.

When the appraisal is carried through successive stages in the normal process of the technic, special problems of enforcement and rehabilitation reveal themselves sharply. These will extend at least into C grade and often somewhat into B grade areas. In one survey area, when the findings were classified by tenement and non-tenement buildings, attention was focused on the need to extend legal controls beyond the old-line tenement law in force, for in some respects the conditions were worse in one- and two-family dwellings than in the larger structures. In another case the special need of Negroes for housing relief was clarified, for it was shown that in a district of mixed white and Negro occupancy the Negro houses were 35 to 150 per cent worse in every rental bracket than those occupied by whites, as measured by median penalty scores for physical facilities of the dwelling.

Does such an appraisal cost too much? Can man power be found for it in these days of personnel shortage? Data collection for the 1,280 dwelling

* This method of employing the Census findings to project a qualitative judgment throughout considerable areas has not yet been tested outside New Haven, but there it has shown very satisfactory results. It is hoped that further tests in other cities will justify the use of the committee's technic and the Census data in combination to obtain relatively rapid evaluations of an entire city as a guide to official policy. The importance of this possibility can hardly be overstressed, for the Census data are available block by block for all cities of over 50,000 population, and they offer, if translated into a screening measure of housing quality, an invaluable and most economical method for delimiting problem areas for further intensive study.

units in the Southwest District study was done with 4 man-months of inspectors' time. Office processing and primary analysis of the dwelling data required between 3 and 4 months' time of one clerk.*

This moderate amount of work is making it possible for the city authorities to arrive for the first time at a basic understanding of housing needs in a substantial portion of the city. It is worth remarking that had not the 4 man-months of field work been assigned to this productive purpose, they might well have been spent on relatively aimless investigation of nuisance complaints to the health department. A sanitary engineer in the group which viewed the first findings of this study exclaimed, "I would be glad to see my inspectors drop all work based on nuisance complaints for two years if necessary, to get this kind of rock-bottom information. On the basis of such material we can begin to plan for some kind of lasting remedy. We could go on for twenty years with ordinary inspection methods, and at the end of that time be exactly where we started."†

IMPLICATIONS FOR OFFICIAL HOUSING POLICY‡

The committee believes that the use of such an appraisal technic on any considerable scale will have effects of the first importance for public policy in housing and city planning. We believe, furthermore, that public health departments have a striking opportunity to promote among other city agencies the

idea of jointly measuring and interpreting the local housing problem, for purposes such as those discussed.**

Only by appraisals of some such type can neighborhoods be classified as to their fitness for continued housing use or their need for clearance and reconstruction. As another of our subcommittees has said, "We must begin to think of comprehensive housing programs in which systematic inspection and official designation of substandardness by areas will serve to guide the agencies of reconstruction into slum areas where improvement under the police power is hopeless, but which may offer prime opportunity for rehousing or other rehabilitation projects. In other words, the vigorous and imaginative exercise of regulative powers may supply for the first time a method of earmarking whole districts, helping to indicate both the relative urgency and the

† Throughout the development of the technic, the committee has stressed the need for simplicity in methods of gathering and analyzing the data, both in order to insure that routine personnel could be used (with a reasonable amount of skilled direction) and in order to minimize the amount of tabulation and analysis required to yield significant findings. The scoring system, for example, since it provides an index or summary expression of over-all housing quality, eliminates the need for certain refined tabulations and analyses ordinarily required with other technics. Scoring the schedules, which might be thought a cumbersome procedure, has been reduced to a rapid and purely mechanical office routine by designing the field schedules in relation to this scoring process. Finally, it may be pointed out that while very large-scale appraisals with this technic might well make use of machine punch-cards and electric card-sorting equipment for tabulations, we have designed our procedures around the simpler manual system of marginal punch-cards. This type of card is processed by a method of needle-sorting which can be quickly learned by any intelligent clerk; and there is almost no expense for equipment. In using these cards we have developed simple and extremely rapid methods of analysis by percentage scales. Use of these scales eliminates the need for manual counting of the sorted cards—which need has usually been regarded as the basic limitation of the marginal punch-card system.

‡ For a fuller discussion of the applications of the technic see section IV of *Public Health Reports, Reprint No. 2359*, previously cited.²

** A manual of the complete procedures for this appraisal technic is being prepared, in order to make the method available for general use. The committee welcomes inquiries from local agencies which might be interested in using the technic.

* These figures exclude time of the committee staff, divided between supervision of other personnel and developmental work on the procedures. They exclude also time required for the environmental appraisal. No comparable figure can yet be given for this part of the technic, since it was carried out complete for the first time in the Southwest District, being conducted in part with experimental procedures. The experience of the study, however, has pointed the way to simplifications in the environmental appraisal which should result in comparable economy with this part of the technic.

types of constructive programs needed for improvement or rebuilding.”³

Specifically, this type of appraisal will help in directing enforcement toward the kinds of control most needed in a given area or for different types of housing. It can supply part of the basis for redrafting obsolete ordinances or statutes to meet the urgent housing problem of the community. It can be used during the war to disclose marginal dwelling structures with unused capacity and worthy of reconditioning to meet the emergency demand. Its findings should be of major value, when appropriately presented to the general public, in rallying popular support for needed housing appropriations or legislation.

Finally, and perhaps most important, surveys of this type, conducted rou-

tinely in problem areas by the regular personnel of collaborating city departments, will supply answers to many of the policy and technical questions involved in housing and rehabilitation schemes for the post-war period. If a large and well planned housing program is to be an actuality in our democratic peace, there is much groundwork to be laid at once.

REFERENCES

1. Cookingham, L. P. Consolidation of Inspectional Services. *Public Management*, Sept., 1942, pp. 264-67.
2. The committee's method is more fully described in *An Appraisal Technique for Urban Problem Areas as a Basis for Housing Policy of Local Governments. Public Health Reports*, February 27 and April 3, 1942. Available as *Reprint No. 2359* on request to the Committee on the Hygiene of Housing, 310 Cedar Street, New Haven, Conn.
3. Subcommittee on Housing Regulation, The Improvement of Local Housing Regulation Under the Law. *A.J.P.H.*, Nov., 1942.

Committee on the Hygiene of Housing, 1943

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Erstwhile Credit Lines

FOR THOSE WHO HAVE JUST TUNED IN
IF the extra word in the title is puzzling, we refer you to page 604 of the May *Journal* for the explanation.

NEWSPAPER SUPPORT, SOUTHERN STYLE

On April 14, the health officers of 33 cities and counties in 18 states were notified by wire that their communities had won awards in the 1942 National Health Honor Roll, annual contest in community health promotion and protection sponsored by the Association and the U. S. Chamber of Commerce. Washington County, Miss., was one so honored. Dr. J. P. Ward is the Director of the Health Department.

On April 30, the Greenville, Miss., *Delta Democrat-Times*, a daily with a circulation of 6,000, nearly all in Washington County, issued a 12 page tabloid supplement devoted entirely to health. Banner headlines announced the winning of the coveted award; a three column cut of the Health Department personnel adorned page one; the history of the department was detailed, and the story of the National Health Honor Roll told with completeness and accuracy. Local advertisers used full and half page space, in many instances, to congratulate Dr. Ward and his staff. Pictures of various health department activities were featured and each received mention and credit in an individual headlined story. One article candidly emphasized in a 20' caption that the "TB Program Is County's Weakest."

If the citizens of Washington County do not know now what they pay some of their taxes for, and are not satisfied that they are making a good investment,

it is not the fault of the *Delta Democrat-Times* nor of Dr. Ward and his colleagues.

COÖPERATIVE SYPHILIS STUDY IN CLEVELAND

The Joint Social Hygiene Committee of the Academy of Medicine in Cleveland and the Cleveland Health Council has published an informative study of the cases of syphilis under treatment in Cuyahoga County, Ohio, in March, 1942, comparable to studies made each March since 1938. Through the coöperation of 1,516 practising physicians and the directors of hospital out-patient departments, hospitals, and institutions, it was found that cases of syphilis under treatment by private physicians and in hospital out-patient departments, hospitals, and institutions, after decreasing each March from 1938 to 1941, increased in the year ending March, 1942. Infectious cases of syphilis increased from 537 in March, 1941, to 641 in March, 1942.

Dr. James A. Doull, Chairman of the Joint Social Hygiene Committee, points out that a rise in the number of patients treated does not necessarily mean higher incidence of the disease but may be indicative only of greater activity in case finding.

The report is a first rate example of a pattern for problem solving at the level of the local community, where resources are mobilized for a well planned effort against an important menace.

SOURCE MATERIAL FOR TEACHING HYGIENE

Those who attended a session of the

Laboratory Section of the A.P.H.A. at the St. Louis Annual Meeting in October, 1942, will recall a scholarly paper by Colonel Edgar Erskine Hume, M.C., U. S. Army, on the Contributions of the Medical Corps of the Army to the Public Health Laboratory. This manuscript has been published in *Science* for April 2, pages 293-300, and should be useful to those who seek fresh sources of material keyed to the present-day emphasis on military medicine for teaching purposes.

WELCOME TO VOL. 1, NO. 1, ESTADISTICA

The first issue of *Estadistica*, Journal of the Inter American Statistical Institute, has just come through. Halbert L. Dunn, Director of the Census, is Secretary General of the Institute, and Juan De D. Bojorquez is Director and Editor-in-Chief of the Journal. The purpose of the official Journal of the Institute is stated to be that of the Institute itself "to advance statistical science and administration in the nations of the Western Hemisphere and to further the practical use of statistics in the solution of social and economic problems which are common to these nations."

The magazine is published in Mexico City and will be issued quarterly. The first number is dated March, 1943. It is printed in clear, open-faced type, is pleasant to look at and to handle. The twenty-odd major and short articles occupy 191 pages. At least half are in English with summaries in French, Spanish, and Portuguese. The others are summarized in English. The lead article, which describes the structure and program of the Inter American Statistical Institute, appears in full in Portuguese, English, and Spanish, with a summary in French.

There is no emphasis on vital statistics in this issue, beyond a discussion of the 5th Census of Brazil, indicating by inference some of the problems facing

the public health worker in that country, but the Conference has a Committee on Demographic Statistics to which a number of projects have been assigned and upon which reports may later be expected. The projects have to do with the addition of an alphabetical index, in Spanish and Portuguese, to the *International List of Causes of Death*; the development of standards for collecting and compiling vital statistics and the establishment of a model center as part of a vital statistics system; establishment of a uniform system for the maintenance of current health statistics and hospital statistics and the cultural classification of Indians in the population census.

The subscription price of *Estadistica* is \$2.00 per year and subscriptions may be placed with Dr. Halbert L. Dunn, Inter American Statistical Institute, Bureau of the Census, Washington, D. C.

VISITORS FROM ABROAD

Every now and then, and more frequently this year than last, one of the staff comments, "There must be a lot of boats in. See these letters and magazines from England, from Russia and from Switzerland."

These safe arrivals, after long and hazardous journeyings, are heartening in many ways. They tell us mutely that progress is being made in the war against the U-boat. They assure us that the lamps have not gone out all over Europe. They give testimony to the courage and fortitude of public health workers overseas, who, under the most difficult circumstances, work, write, and see things through the press.

The English medical and health journals are no longer months late. That they could be published at all remains a miracle.

The League of Red Cross Societies continues to distribute mimeographed material from its office in Geneva.

Publication No. 5, 1942 series, recently received, contains articles on "The Nurse in Industry," "Mental Hygiene," and one on the vitamin C content of Swedish briar rose hips. The cultivation of briar rose hips may have significance for the United States, if, as is claimed, they are superior to oranges as a source of vitamin C and, further, that they may be brewed to provide a "most excellent beverage, far healthier than either coffee or tea."

The U.S.S.R. Society for Cultural Relations with Foreign Countries has been responsible for the appearance in this country of many interesting documents. Late arrivals include copies of general magazines, pamphlets on various aspects of Russian life, and an impressive volume on Pushkin—all published in Moscow and in English. If you have a periodical to exchange for publications of the Society, it would be worth while to suggest the arrangement. The address is: B. Gruzinskaya 17, Moscow 56, U.S.S.R.

THE HIGH SCHOOL VICTORY CORPS

High School Victory Corps are being established in many schools throughout the country. Coöperative efforts of the U. S. Office of Education, the Army, and the Navy have launched this national effort to secure the active participation of high school youth in the community's war work, and to train youth for war services which are ahead when school days are over.

Building and maintaining physical fitness is an important part of the program. Two manuals prepared by the Office of Education in coöperation with the Army, the Navy, the U. S. Public Health Service, the Office of Defense Health and Welfare (now called the Office of Community War Services), and other agencies offer detailed suggestions to schools in developing physical fitness programs. They are entitled *Physical Fitness through Physical Edu-*

cation for the Victory Corps and *Physical Fitness through Health Education for the Victory Corps*.

In reprinting the advance digest of the second manual in *Health Briefs*, Tennessee Department of Public Health monthly, the Editor, Dr. Robert H. White, remarks in a footnote:

Although this article is worded for high schools organized in the Victory Corps program, the potential application is much wider. The proposed health measures include the same fundamentals that every school should be giving balanced emphasis to, regardless of secondary or elementary level, whether inside or outside of the "Victory Corps" framework.

A FOOTNOTE TO THE PHYSICAL FITNESS PROGRAM

Dr. Carl A. Wilzbach, Health Commissioner of Cincinnati, under whose direction school health services are conducted, writes of recent experiences in his city. We quote:

When the physical fitness program was started we had a meeting with the Superintendent of Schools, and decided that there would be no physical fitness efforts made until we had again examined senior high school boys and girls to be sure that they could undergo vigorous training.

The examinations have been completed in the public schools and we are at the present time taking the parochial schools. Some 2,000 boys and girls were examined in the public schools, and I want to mention only a few things which we found. We set up a scheme to take care of the physical defects which we found in advance. These included the private physicians, and dentists, the community facilities including the public health clinics and out-patient dispensaries. We found that 1,552 had defective teeth, 335 weak and flat feet, 153 with vision defects, 100 with hearing losses, 131 with heart and cardiovascular system abnormalities. Public health nurses are now following all of these children discovered to see that their physical defects are cared for. We were surprised to find how many could go to private physicians and this, of course, made the clinic and public health load much less.

I think there is no doubt of the importance of this effort because these boys will soon be called before selective service boards and

the girls will either be in some branch of the armed forces or in industry.

ADVENTURES OF A MEDICAL OFFICER IN THE PARACHUTE INFANTRY

Captain John Y. Battenfield, Surgeon, Army Medical Corps, illuminates one aspect of army medical life in some recent letters. Dr. Battenfield, before he was commissioned, was connected with the National Society for the Prevention of Blindness, New York. He received the M.P.H. degree from Johns Hopkins in 1942.

Here are excerpts from two letters written six weeks apart:

"You may be interested to know that I went from Sheppard Field to the Medical Field Service School at Carlisle Barracks and from there to the Parachute School at Fort Benning where I qualified as a parachutist on December 5 and very shortly thereafter was ordered to foreign service. At present I am a Surgeon in the Parachute Infantry and am enjoying my work very much. All our medical enlisted men and the medical officers jump with the troops both in training and in combat.

"We have had several very interesting jumps since we have been here. On one we got about 200 men into the jungles, including ourselves, due to an erroneous weather report on wind velocity. I was the second officer on the ground, or rather in the trees, and it certainly was quite exciting to watch the remainder of the 200 land in the trees. Not a man was seriously injured.

"My Commanding Officer has requested that I prepare a pamphlet for the men on jungle health. In order to understand the problems concerned better than I could by consulting the literature only, I took 15 men, including myself and another officer, to act as guide for an 8 day jungle hike. Believe me, it was certainly educational. I have never seen so much rain and mud. We walked up and down mountains of rocks and mud, waded rivers, slept in wet, cold hammocks, were bitten by mosquitoes, chiggers, ticks, ants, and buffalo gnats. We ate jungle rations which are excellent, and C rations which are very heavy to carry and very unpalatable. We were resupplied by transport plane and parachute packages. We had only two cases of dysentery during the trip. Our water was of course chlorinated. Prac-

tically the entire contents of first aid kits were thrown away after the second day because of the weight, as well as everything else not absolutely essential. All in all it was very interesting but not something one wishes to repeat very often."

"Since my last letter we have been extremely busy and have had a number of unusual problems. Your letter has remained unanswered so long because shortly after its arrival we had a night jump with the task of capturing one of the large airports here (just a training problem) and I was number 21 man and last in my stick of jumpers. By the time I made my exit from the door of the plane we had overshot the jump field and I made a very hard landing against a steep hill about 200 feet high. The night was so black it looked perfectly level and I did not expect such a terrific jar. The result was that I fractured my right foot and suffered a mild cerebral concussion. The joke of the situation was that I had the Surgeon of this area as a guest inspecting our evacuation facilities under difficult circumstances and I was the first casualty. We lost 10 per cent of our command as jump casualties because of the darkness and a high wind, but captured the airport completely."

DESK BLOTTERS PROMOTE HEALTH EDUCATION OF DOCTORS

The Bureau of Social Hygiene of the New York City Department of Health, of which Dr. Theodore Rosenthal is Director, has recently distributed an informative blotter to doctors which carries the following information.

Sulfathiazole is the accepted drug for the treatment of gonococcal infections.

Sulfathiazole may be administered on either a 5-day or a 10-day plan. The 5-day plan is preferred, provided there are no indications for the longer course. The total amount of the drug is prescribed at the first visit, but the patient should be seen every 48 hours.

FIVE-DAY PLAN: Administer 1 gram (15 grains) of sulfathiazole 4 times daily, after each meal and at bedtime, for 5 days (total dosage 20 grams).

TEN-DAY PLAN: Administer $\frac{1}{2}$ gram ($7\frac{1}{2}$ grains) of sulfathiazole 4 times daily, after each meal and at bedtime for 10 days (total dosage 20 grams). No local treatment of any type is necessary.

If the patient is not cured with the first course of treatment, stop sulfathiazole for

one week and then repeat the course of sulfathiazole as before. In the interim, local therapy with mild antiseptics should be given.

In women, acute gonococcal salpingitis requires treatment in bed. Two grams of sulfathiazole per day as prescribed in a suggested form of oral treatment. Fever, pain and tenderness almost or entirely disappear in from 48 to 96 hours in most cases. Pelvic or Bartholin gland abscesses must always be treated surgically.

Consultation is desirable in the presence of complications or failure to react promptly and favorably. Routine serologic examination for syphilis on all patients is recommended.

SPRING TONIC (PRINTED)

As cheerful as a dandelion and with the same high visibility among a host of less imaginative materials on the subject is a nutrition leaflet entitled "For Health" for which the Mississippi State Board of Health, Felix J. Underwood, M.D., Executive Officer, is responsible. Dandelion-yellow, garlanded with fruit jars and vegetables, and with casual hand-lettered vegetable-stand signs on its front cover, it makes one hungry for a tomato and lettuce sandwich and a glass of fruit juice. What more than that can a leaflet on fruits and vegetables do?

REPORT OF THE NRPB

The alacrity with which the Report of the National Resources Planning Board was dropped from the newspapers has been equalled only by the short shrift given two years ago by the press generally to the findings of the Temporary National Economic Committee. That the newspapers of the country failed to follow through with the implications to the public for a happier, more secure post-war world, set in perspective by the recommendations of the NRPB, is obvious by the results of a recent Gallup poll. Indeed, it is obvious that the original and, in most instances, the only notice taken by the nation's press of this significant study was totally inadequate. The

Gallup poll indicated that the public is uninformed and therefore unimpressed. Seventy-five per cent of the persons queried knew nothing about the report. Thomas Jefferson said if he had to choose between good government and good newspapers, he would select the latter. Where are the good newspapers of the country on the issue of social security?

New York's daily, *PM*, has done the exceptional job with the report of the NRPB. It has not only followed through, but it has skillfully related many of the individual recommendations to a present Army sergeant and his family, translating the technical language to the language of the man in the street, in this case, an ex-railway employee, who expects to return to his \$30 a week position when the war is over. There is no generalization; instead, each recommendation is projected into the man's life in terms of him, his wife, his child, and his pocketbook. This is finding him where he lives. This is interpretation of a high order, recommended to public health workers as a technic.

RELATIVE CONTRIBUTIONS OF PROTEIN RICH FOODS

A new and vivid method of visualizing the contributions to the dietary of protein rich foods has been published by the Division of Maternal and Child Health of the Oregon State Department of Health, of which Mrs. Laura P. Wells is consultant in nutrition. Using circles to represent the daily requirement of a specific nutrient, the contribution of a given portion of various protein rich foods is indicated graphically in such a form that it could be used in the average family kitchen. The chart is colorful and commendable in that it does not complicate the picture by an exhaustive treatment.

The chart was compiled by Dr. Margaret L. Fincke, Associate Professor of

Foods and Nutrition in the Oregon State College, and has been published jointly by the State Board of Health and the Oregon Nutrition Council. The charts are obtainable in quantity lots at a cost of \$1.25 per 100.

THE HOUSING AUTHORITY AND THE HEALTH DEPARTMENT

The relation of the health officer to the slum clearance and low rent housing movement is not as close here as it is in England; yet nevertheless even in this country there are numerous and important points of contact. A survey of a group of recent housing authority reports prepared for the *Journal* by C.-E. A. Winslow, Dr.P.H., Professor of Public Health at Yale University, brings out some of these relationships.

The importance of housing to the health department is indicated by statistics in the report of the Boston Housing Authority, showing that on the slum sites replaced by eight projects of the Housing Authority, 21 per cent of the original dwellings had no water-closet within the dwelling unit, 62 per cent had no tub or shower, 47 per cent had no supply of hot water, and 93 per cent had no central heating. It is clearly desirable that the health officer should have a clear idea of the distribution of such substandard housing in his area. Memphis, Tenn., has played a pioneer rôle in obtaining such information, partly, no doubt, because Dr. L. M. Graves, City Health Officer, is also a member of the Housing Authority; this Authority in its last annual report refers to a study of the whole area within a five mile county radius, revealing the fact that 62 per cent of the dwellings in that area are substandard. Baltimore, Md., is another city which has made notable contributions in this field, and Dr. Huntington Williams's last report as health officer notes the approval of two new ordinances giving the

Commissioner of Health broad powers in dealing with unhygienic housing and the increase in housing inspection made possible by an increased field staff.

In many communities, voluntary associations coöperate with both the health officer and the Housing Authority. Thus the Pittsburgh Housing Association reports continuing intensive surveys of the city section by section which should prove invaluable in constructive planning. The Washington Housing Association has done an admirable piece of work in preparing a comprehensive housing code effectively coördinated with projected revisions of local building and health codes. It also reports on a comprehensive study of the rodent problem, which is leading to a city-wide campaign under a sanitary engineer employed by the Health Department.

Many housing authority reports refer to the development of clinics and health centers in the projects themselves—another type of coöperation of substantial significance. The Los Angeles Authority reports that “young America must be kept healthy—so the Los Angeles Health Department sees to it that youngsters are kept germ-free in its well-baby conferences, held at various locations throughout the city including public housing developments.” The report of the New York City Housing Authority notes that “the Child Health Stations at East River Houses and Kingsborough Houses were designed with a new type of room arrangement to permit greater privacy to the patient, more quiet for the staff, and less congestion for all. The Authority enlisted the coöperation of the Department of Health in making these design changes. The combined study by the two agencies resulted in sound improvements apparent in the plan for the proposed Child Health Station for Amsterdam Houses.”

The Pittsburgh Housing Association report says: “Much of the Associa-

tion's program is devoted to direct coöperation with other social agencies, such as the Public Health Nursing Association . . . The Public Health Nursing Association, always aware of problems of sanitation and safety in the home, reported 52 per cent of the housing complaints received in the last year." As to results achieved, the Peoria Housing Authority cites the following comments by tenants: "The first winter in several years I have been able to walk" (from an arthritic). "The steady heat and warmth have done my joints more good than all the doctors and their medicine" (from an elderly woman with rheumatism). "We have not had a single cold all winter." "All my three children had pneumonia last winter because the house was so old and cold; this winter they have not had a slight cold."

More authoritative to the readers of the *Journal* is the following comment by Dr. J. I. Linde, Health Officer of New Haven, in the Report of the New Haven Housing Authority. He says:

"Of all city officials, the health officer, by virtue of his official duties, is in the best position to sense the connection between housing and health. Historically, housing laws (tenement house acts), together with those concerned with the control of contagion and the laws of hygiene, have formed the basis of the Sanitary Code.

"The three low rent government housing projects have been quick to demonstrate the positive effects upon healthful living which good housing offers.

"Demolition of entire blocks of slums has eliminated housing complaints from these areas to the Health Department, so that the health inspector's functions in such areas are reduced to that of health educator. No overcrowding, sanitary plumbing, adequate heat,

light, ventilation, numerous safety features—all of these have exerted a direct influence upon the physical side of the occupants' lives by serving to keep the incidence of disease and accidents to a minimum.

"Provision of adequate play space for children, nursery care of children of working mothers, recreational facilities and educational programs for adults, construction of homes to suit occupants' needs and comfort, and planning throughout the homes for the healthful living of the occupants—these have contributed immeasurably to the psychological factors in health which make for balanced mental hygiene for the individual and sound family and community life of groups.

"Finally, establishment of health centers in the housing projects to carry on health programs (such as dental care, prenatal instruction and care, infant hygiene, health education classes, etc.), is bringing necessary health services closer to the citizens of New Haven.

"Thus, the housing project is becoming the generator of healthful living, immediately influencing the lives of its residents as well as those in the surrounding areas."

In his participation in the housing movement, the health officer can obtain substantial aid from our Committee on the Hygiene of Housing. This committee has recently prepared an appraisal procedure for the measurement of the quality of individual dwellings and environmental areas which is far superior to any hitherto available and yet so simple that it can be applied by the average health department inspector. The committee is also making studies of the principles underlying the legal control of housing, particularly through the application of sanitary codes, which should prove of substantial value.*

* Information in regard to the work of the committee may be obtained from its headquarters, 310 Cedar Street, New Haven, Conn.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

Osler's Principles and Practice of Medicine—Originally Written by Sir William Osler. Designed for the Use of Practitioners and Students of Medicine—By Henry A. Christian. (14 ed.) New York: Appleton-Century, 1942. 1,500 pp. Price, \$9.50.

For the past fifty years Osler's *Principles and Practice of Medicine* has been one of the outstanding medical textbooks in the English language. The 14th edition revised by Dr. Henry A. Christian maintains the tradition of Osler's original volume in that it is written entirely by a single author. The comprehensive manner in which disease is treated in this newest volume is a tribute to Dr. Christian's breadth of interest and experience in internal medicine.

The question may be debated as to whether a single individual is justified in undertaking the tremendous task of revising or writing a textbook of medicine in this age of rapid advance in medical knowledge. Vast as the subject of medicine was in 1892, its essence was contained in Osler's original volume, which he compiled almost single handed. Medicine then, however, was largely a descriptive science. Much was known about the clinical manifestations of disease and its morbid anatomy, but of etiology, pathogenesis, and specific therapy there was but fragmentary knowledge. Today the author's task is far more difficult. The premedical sciences in particular have added a prodigious body of facts not known to the physician of the last century. No longer can all of medicine be mastered by a single mind. The day has come when a textbook of

medicine cannot be sufficiently comprehensive unless compiled by a series of contributors, each of whom is qualified as an expert in a specific field of medical science. Although Osler's *Principles and Practice of Medicine* will continue to be widely used by American students of medicine, it is doubtful if it will remain among the leading textbooks in the English language if subsequent revisions are made by a single author.

W. BARRY WOOD

Fundamentals of Immunology—By William C. Boyd, Ph.D. New York: Interscience Publishers, Inc., 1943. 446 pp. Price, \$5.50.

The primary value of this book is its extensive modern discussion of antibody-antigen reactions and the considerations of the various theses involved. The author states that the point of view adopted has been, so far as possible, the point of view of the chemist, and it would appear that this is a very true statement of the approach. The book scarcely deals with specific problems of infection and for that reason has little of applied value to the clinician or the diagnostic laboratory worker. However, for the individual who is seeking a background of current investigation in terms of physical chemistry, there is much to be gained; in fact, the book is so weighted in this direction that many of the other sections seem to be included only for the sake of completeness in headings. It is quite clear that the author deliberately avoids discussion of mechanisms of infection and immunity except as serological reactions. The final chapter, dealing with laboratory

and clinical technic, would serve well in outlining a course to illustrate the various immunological procedures.

There has been need for a book attempting, in a descriptive manner, to make the basic reactions of immunology clear in terms of modern concepts without losing the student in a mass of symbols. This effect has been gained.

THOMAS FRANCIS, JR.

Orthopedic Conditions at Birth—Nursing Responsibilities—*By Jessie L. Stevenson, R.N. New York: Joint Orthopedic Nursing Advisory Service of the National Organization for Public Health Nursing and the National League of Nursing Education, 1943. 80 pp.*

Nurses as professional workers are becoming increasingly aware of the orthopedic content of everyday nursing care, and the need for the interpretation of orthopedics in terms applicable to the responsibilities of the nurse caring for the infant, supervising the health needs of the preschool or school age child, or providing nursing care for the individual confined to bed for a long period of time because of some infectious process. This handbook, *Orthopedic Conditions at Birth—Nursing Responsibilities*, will be welcomed by those nurses who are interested in the interpretation of orthopedic care as it relates to the care of the infant and young child.

A general review of anatomy, etiology, and pathology is presented for each of the several conditions discussed. Present trends in treatment are briefly reviewed. The discussion is directed toward the nursing responsibility for recognition of these conditions and prompt reporting of observations to medical authority in order that diagnosis may be made and early care instituted. Considerable emphasis is placed on the responsibility of the nurse in giving interpretation and support to

the family during a prolonged treatment period, and in promoting desirable family and community attitudes toward conditions which cannot be totally corrected.

The material presented in this handbook, together with the references cited, constitute a means of rapid review for those familiar with these conditions and a means of developing a more extensive fund of information for those less familiar with the conditions cited. It should prove of particular value to both institutional and public health nurses engaged in any phase of child and maternal care.

FLORENCE PHENIX

A Surgeon's Fight to Rebuild Men (An Autobiography)—*By Fred H. Albee. New York: Dutton, 1943. 349 pp. Price, \$3.50.*

The publisher characterizes the author as "the world's foremost Ambassador in White," even though the title indicates that the book concerns something so undiplomatic as a "Fight." But before one has progressed far beyond Part One it is obvious that the title does fit the book, and after reading Chapter XXIV, which describes Dr. Albee's controversy with the New York County Medical Society, this reviewer was sure this theme had destroyed any possible effectiveness of the book.

Dr. Albee describes his bone graft surgery simply and well, both in the body of the book and in the appendix. That he is a master in this field is universally acknowledged, but one wishes he had admitted a few mistakes instead of tacitly corroborating Lowell Thomas's statement in the foreword that he is "one of the great surgeons of all time." The apparent purpose of the introduction into the book of several testimonial letters from former patients is to support this thesis.

The book lacks continuity, even

though there is a disingenuous attempt to show that his career as a bone graft surgeon was largely determined by observing his grandfather graft apple trees. The style is jerky, due to the author's tendency frequently to go rather far afield. In thus doing, he makes numerous loose, inaccurate statements, such as that Richard Strong "abolished" typhus in Serbia, that army medical officers at Hoboken were "compelled to deflu embarking troops," that the author's research in U. S. General Hospital No. 3 at Colonia, N. J., was "probably the only animal research performed in any army hospital in this country during the First World War." The author's statements concerning his status and activities at General Hospital No. 3 include numerous inaccuracies as well as several figments of a fertile imagination—this on the authority of his commanding officer, Col. Upshur, to whom Dr. Albee gives no credit for organization or administration. Dr. Albee's statement that he himself organized the hospital is overdrawn, to say the least, for he had no authority or responsibility at that hospital beyond that of any chief of a surgical service.

Much space is devoted to the Carrel-Dakin treatment, leaving the reader with the impression that this is still the preferred treatment, while only seven lines are devoted to the Orr technic, which is one of several technics which have practically superseded the Carrel-Dakin method. EDWARD G. HUBER

Food Poisoning—By G. M. Dock, Ph.D., M.D. Chicago: University of Chicago, 1943. 138 pp. Price, \$2.00.

A colleague of the late E. O. Jordan, student of F. W. Turner and an authority on food poisoning, Dr. Dock has had this book published at an opportune time. The individual concern about our food; the necessity for feeding large numbers of groups in war

production plants, naval and military areas, and the exodus of food handling personnel to more lucrative employment justify its being read and studied and kept as a reference manual.

Besides the introductory chapter, botulism, the Staphylococci, the Salmonella, the little known alpha-type Streptococci, poisonous chemicals and poisonous plants and animals are covered. Botulism and the Staphylococci are included, rightfully, in one-half of the book. The interest in and encouragement of home canning and the many outbreaks due to the Staphylococci justify this.

Although not replete with references, it is refreshing to observe that 90 per cent of the references cited are from publications of the past twenty years rather than those of the era when "ptomain" was the only cause of food poisoning.

Preventive means are given for practically every known type of food poisoning. Tables for use by the statistician, bacteriologist, and investigator are given, as well as suggested forms for questionnaires that may be used by the public health worker.

This book should be in the hands of every dietitian, army and navy mess officer, health department food control and laboratory personnel, as well as in hospital and other institution libraries. It should be consulted frequently before and during any investigation of food poisoning outbreaks.

FERDINAND A. KORFF

Plumbing Practice and Design, Volume 1—By Svend Plum. New York: Wiley, 1943. 308 pp. Price, \$4.50.

This book is an attempt to consolidate the scattered data on plumbing, to present these data in uniform terminology and in a manner usable for solving the many problems occurring in the design of plumbing systems. The

material is set forth and its use is left to the ingenuity of the reader, depending upon his knowledge of the underlying principles.

First there is a discussion of the types and causes of corrosion and how different materials react to corrosion. The remainder of the book in format resembles a set of specifications since recommended standards for all materials, piping, fittings, controls, accessories, pumps, etc., are included. Fire protection codes and regulations are included as well as a chapter on air piping and equipment.

The writer is to be commended in using only recognized accepted standards and specifications sanctioned by the federal government and the various technical societies, such as the American Society of Testing Materials, American Society of Mechanical Engineering, American Water Works Association, National Board of Fire Underwriters, New England Water Works Association, and for his frequent references to ASA Standards.

C. P. STRAUB

Intensive Rural Hygiene Work in the Netherlands East Indies—

By J. L. Hydrick, M.D. *Introduction by Professor J. Snapper. New York: The Netherlands Information Bureau (10 Rockefeller Plaza), New York, N. Y. Bull. No. 7, 1942. 83 pp.*

Dr. Hydrick has presented, in this pamphlet, in an objective and practical manner, the development and functions of a general public health program in the Netherlands East Indies.

He found from his work in Java that success depended upon a complete separation, administratively, of the program in community hygiene from the medical care program. In the United States, the trend has been to coordinate all community-wide activities in the promotion of health. Some health administrators believe that the medical

care program should be incorporated in the activities of health education.

Dr. Hydrick is convincing in his arguments that these two activities should be completely separated. He first discusses in some detail the principles of good public health education, and then shows in a realistic way the application of these principles to people in rural areas where superstition is common, and where approximately 65 per cent are illiterate.

The fundamental plan on which he developed his work is that any worthwhile and permanent public health program must of necessity win the active cooperation of the people. Furthermore, it must stimulate people to activity and to the practice of good habits of personal hygiene.

He found that the most successful means to accomplish this objective was through home visits and personal instruction. At the outset, trained nurses were used for this educational work, but they were found "to remain on a far too high level for the work." He then devised a plan in which hygiene teachers (*hygiene-mantris*) were used in home instruction in hygiene with considerable success. *Hygiene-mantris* are men who are carefully chosen on the basis of their personal qualifications. They are given an 18 months' course in hygiene before they are sent into the field. Their work is entirely educational. This plan succeeded where all other plans had failed.

He also found another individual to be valuable in village education: this was the trained midwife, who is sent into the villages to train the unskilled and untrained midwife (*doekoen-beranak*) in the elements of maternal and child health protection.

Dr. Hydrick emphasizes the fact that physicians were of little value to him in his health education work. He insists that medical personnel need special training before engaging in public

health, and believes that in the future the training of physicians in hygiene and protective medicine should be begun in the medical school. Plans were made for this training with the coöperation of the Public Health Service, in the Medical School at Batavia.

This pamphlet is a report of the Netherlands East Indies Health Service, first published in Dutch in 1937. The English translation may be obtained from the Netherlands Information Bureau, 10 Rockefeller Plaza, New York, N. Y. It is worthy of careful reading by all public health workers who are especially interested in rural health education. W. G. SMILLIE

Man in Structure and Function (2 Volumes)—By Fritz Kahn, M.D. Translated from the German and edited by George Rosen, M.D. New York: Knopf, 1943. 742 pp. Price, \$10.00.

Fritz Kahn's work, *Man in Structure and Function*, is an extraordinary production. It is distinguished in two respects: its illustrations and its statistical or numerical versions of anatomical and physiological data. The first is by far the more noteworthy. Dr. Kahn has the rare gift of visualizing his data, and he reveals a superb skill in projecting his visions in the form of three-dimensional, dynamic drawings. He has also a keen aptness in literally drawing analogies, and these serve to make abstruse relationships and functions easy to grasp.

The work, consisting of 742 pages of text and 470 illustrations, systematically surveys the entire body both anatomically and physiologically. Interspersed in the text are numerous references to pathogenic agents and conditions, showing the mechanisms by which these produce disorders in the human body.

Man in Structure and Function should prove particularly useful to health educators, biology teachers, and

nurses. But it is bound to be of interest to everyone who is concerned with the constitution and operations of the human organism. The translator, Dr. George Rosen, has rendered the text of the work, originally published in German, in clear and facile English. The publisher, too, deserves commendation for having produced a very handsome twin book.

There is, however, one observation that must be made concerning the text of the work and its illustrations. Both are at times too definitive and too categorical in substance and in implication. Those are the inevitable handicaps of simplification. Yet, without some simplification none but the expert could understand the human body in structure and function. With this minor reservation, Dr. Kahn's work can be welcomed as a valuable contribution to popular medical literature.

IAGO GALDSTON

The Infectious Diseases of Domestic Animals—By William Arthur Hagan. Ithaca, N. Y.: Comstock Publishing Co., Inc., 1943. 665 pp. Price, \$6.00.

The author's preface rightly describes this book which is an outgrowth of his lectures on "pathogenic bacteriology and immunology" at the New York State Veterinary College. It is not a textbook on bacteriology, as much of the material usual in such books has been omitted, it being taken for granted that the general principles of the subject have already been learned by the reader. On the other hand, it contains an unusual amount of material on the fungi, protozoa, and viruses pathogenic for domestic animals. The author states that it will be used by himself in his teaching and hopes it will be found useful to others giving similar courses.

The text is well and interestingly written. In describing the diseases due

to bacteria, enough of the cultural characteristics and methods of isolation of disease-producing organisms is given to make the subject clear. The discussion of diseases which are common to man and animals, or those which are transmitted from animals to man, is well done and sufficient.

The giving of proper credit for work is not as exact or complete as it should be. The reviewer believes in the historical method of teaching and is especially concerned in giving Americans credit for their work. For example, mallein was first made by the late Dr. Leonard Pearson though usually credited to Kalning, a Russian. In a book by a veterinarian and intended for veterinarians, this seems an unfortunate omission, especially in view of the tendency of European writers to ignore American work—a tendency which has been to a certain extent now overcome. The author perpetuates the error of giving 1898 as the date of Theobald Smith's differentiation between human and bovine tubercle bacilli. It is true this date is correct for one of Dr. Smith's papers, but the first on the subject appeared in 1896.

The illustrations are on the whole good and abundant enough. On page 37, the picture showing the bleeding of horses for the production of antitoxin is not in accord with general practice, and the legend misleading.

The book can be highly recommended as covering the ground outlined in the Preface. We wish that human physicians could be induced to read books of this sort. Even to those who have already done a fair amount of reading of veterinary medicine, the book is a revelation of the many infectious diseases to which domestic animals are subject. It is not out of place to repeat here the often given warning concerning the number of diseases which are transmissible from the lower animals to man, and the large

part which veterinary bacteriology and veterinary medicine in general play in the health and welfare of the human race.

The text is well documented, the references being conveniently placed at the end of each chapter. The printing is good. An excellent Table of Contents and a good index add to the practical value of the text.

MAZÛCK P. RAVENEL

Infant and Child in the Culture of Today—the Guidance of Development—By *Arnold Gesell, M.D., and Frances L. Ilg, M.D., with the collaboration of Janet Learned, M.A., and Louise B. Ames, Ph.D.* New York: Harper, 1943. 399 pp. Price, \$4.00.

Arnold Gesell and his colleagues have produced another unique volume based upon their exhaustive studies in the Yale Clinic of Child Development. This time, however, the material is presented in such a manner as to be of considerable practical value to parents and child welfare workers alike. It is permeated with a philosophy which has a distinct value in orienting our present-day culture toward democratic ideals as opposed to a totalitarian type of culture. The chain of evidence running through the entire volume is linked to the theme—"This volume conceives cultural guidance in terms of the optimal needs of the individual organism. The cultural pattern must be adapted to the growth pattern because in the final analysis all individual development depends upon intrinsic self-regulation. There is no adjustment to culture other than self-adjustment" (page 53).

Part One of this fascinating book deals with Growth and Culture and considers "The Family in a Democratic Culture" as well as "The Personality and Acculturation" of the child. "The Cycle of Child Development" concludes this section.

Part Two takes up systematically The Growing Child in successive stages of growth and development. It is divided in a way to be especially helpful to parents by outlining the behavior profile for each age period followed by the various functions carried out in a Behavior Day.

In Part Three the Guidance of Growth is presented in a series of chapters taking up in considerable detail sleep, feeding, bowel and bladder control, personal and sex interests, self-activity, sociality and self-containment.

The Appendix is designed to be practical and helpful for all those concerned with child care. It gives a Behavior Day Chart for Self-Regulation Scheduling; lists of toys, play material and equipment, books for preschool children, and musical records for infants and young children. A well chosen list of selected readings concludes this part. The illustrations and line drawings have been selected with care, and a comprehensive index is included.

This is a volume that can be read from cover to cover with rapt attention and with great profit. The publishers are to be commended for the excellent format and illustrations.

RICHARD A. BOLT

Manual of War-time Hygiene: A Supplement to a College Text-book of Hygiene—By Dean Franklin Smiley, M.D., and Adrian Gordon Gould, M.D. New York: Macmillan, 1942. 86 pp. Price, \$1.00.

In a short booklet the authors, from the Department of Hygiene and Preventive Medicine at Cornell University, Ithaca, N. Y., aim to redirect and reorient the college student's work in the field of hygiene. This is because today the students are definitely preparing themselves for commissions in the armed forces or for equally important positions in civil life during the

greatest of all wars. Personal hygiene, always important, takes on added significance for the collegian who on graduation may be assigned the responsibility for the health and well-being of groups of soldiers or other military personnel. The pamphlet seeks particularly to give the college man a summary of and reading references related to the matters of hygiene of import to an officer in military service.

The greater portion of the text deals briefly with elementary military hygiene, fitness for service, the prevention of specific diseases by vaccination or inoculation, camp sanitation, nutrition, the organization of military medical care, recreation, and the battle against the venereal diseases. There follows a short section on civilian defense with emphasis on the emergency medical services and the problems of chemical warfare. The third main segment of the booklet is devoted to war-time first aid and this is followed by appendix material on artificial respiration. There is a good bibliography that should be relied upon heavily by any student who desires to take the matter of hygiene seriously in times of war.

The short hour or two needed for a thorough study of the pamphlet will well repay any college man. The pages devoted to the insect-borne diseases and the combat against the venereal diseases are among the best in the volume. Everyone should know the matter presented in regard to chemical warfare and first aid. If the authors have compiled their matter to a large degree from available authoritative documents, there can be no particular objection to this. However, while it is recognized that civilian medical service will be limited in war-time, it may be a bit severe to put the "must" in the expression, "The military forces must have 6 or 7 physicians for each 1,000 officers and men."

HUNTINGTON WILLIAMS

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Preventive Measures against Keratoconjunctivitis—This committee report sets forth the present-day understanding of the nature, the clinical course, the treatment, period of infectivity, and preventive measures against epidemic keratoconjunctivitis.

ANON. Epidemic Keratoconjunctivitis. J.A. M.A. 121, 14:1153 (Apr. 3), 1943.

Rural Sewage Disposal—Recommendations of a notable committee on rural sanitation will serve as a guide to satisfactory field practice concerned with sewage disposal methods. Working drawings for the construction of acceptable home disposal plants are included.

ANON. Recommendations of Joint Committee on Rural Sanitation-Rural Sewage Disposal. Pub. Health Rep. 58, 11:417 (Mar. 12), 1943.

They Still Need Help—Though the amount of money available for food does influence the quality of the meals, it was found in this survey that nearly half the families, which spent enough for the table, still had poor diets. Instruction is still badly needed in the newly self-sufficient families, even those in which someone has learned to prepare a suitable diet for a tuberculous patient, for this knowledge seems to have little effect upon the family dietary pattern.

DOWNES, J. Recent Changes in Income and Food Expenditures among Tuberculous Families in Harlem (and) A Study of Food Habits of Tuberculous Families in a Harlem Area of New York City. Milbank Quart. 21, 2:158 (Apr.), 1943.

Healthy Hearts Behave Variously—In normal young men pulse or blood

pressure, at rest, is not indicative of ability to work. Estimates of capacity for hard muscular work should be based upon ability to do it, and speed of recovery of heart after the exercise.

BROUHA, L., and HEATH, C. W. Resting-Pulse and Blood-Pressure Values in Relation to Physical Fitness in Young Men. New Eng. J. Med. 228, 15: 473 (Apr. 15), 1943.

About Lead Poisoning—As these are the days of industrial hygiene's glory, it would seem that the attention of all health workers should be called to six important papers on the industrial health hazard of lead poisoning. Only the first is listed below, because of the limitations of space, not because it should be singled out for mention.

BUXELL, J. The Measurement of Industrial Lead Exposures in Air Analysis (and five papers on other aspects of lead poisoning). J. Indust. Hyg. & Toxicol. 25, 2:35 (Feb.), 1943.

Once Upon a Time—When we had nurses to spare, the ailing well-to-do's were coddled by the private duty nurse, and the ain't-got-nothing's called in the visiting nurse, but the in-betweens had less nursing service than high or low income groups. Somebody should have told Mrs. Middle Income that she too could have the services of the visiting nurse.

COLLINS, S. D. Variations in Nursing Service with Family Income and Size of City. Milbank Quart. 21, 2:188 (Apr.), 1943.

Coliform Test Gets Court K. O.—Maybe you had better study this report yourself, but it seems that occasional cases of typhoid fever undoubtedly are due to public water supplies which meet approved standards, and that a

factor of safety provided by millions of coliforms per each *Eberthella typhosa* might help to improve this situation.

KEHR, R. W., and BUTTERFIELD, C. T. Notes on the Relation between Coliforms and Enteric Pathogens. Pub. Health Rep. 58, 15:589 (Apr. 9), 1943.

What's Past Is Prologue—Here you will find an answer to the question "How well educated were the nurses of 1941?" In a nutshell, it is "Pretty well, I thank you."

LANDAN, H. Academic Qualifications of Registered Nurses as Revealed by the 1941 National Survey of Registered Nurses. Pub. Health Rep. 58, 12:465 (Mar. 19), 1943.

Tuberculosis in Teachers—In the city of Quebec and in the year 1940, and in a group of school teachers, 16 were found tuberculous; most were in an early stage of the disease and were unaware that they were a danger to the pupils. The following year a Provincial law was passed requiring x-raying of all teachers. This time 128 were found to have active tuberculosis of the lungs, 176 non-active, and 484 more needing observation.

LA BERGE, L. Detection of Tuberculosis in School Teachers in the Province of Quebec. Canad. Pub. Health J. 34, 3:121 (Mar.), 1943.

Cheerful Note —Excellent results were obtained in the sulfonamide treatment of gonococcal ophthalmia neonatorum—93.8 per cent recovering with normal eyesight. However, exacting pediatric and nursing care are matters still of great importance.

LEVIN, I. M., and BLATT, M. L. Gonorrheal Ophthalmia Neonatorum. Am. J. Nurs. 43, 4:351 (Apr.), 1943.

The "Must" of the Month—Very emphatically, you must read all the leading articles in the May 1 issue of the J.A.M.A. Eleven papers are too many to mention individually in this crowded bibliography, but a partial list

of subjects—tropical diseases, epidemic influenza, malaria, nutritional diseases, trends in scientific research, health as a world problem, and inter-American coöperation—will indicate to you the necessity of reading them all, thoughtfully and immediately.

MACKIE, T. T., *et al.* Papers Read before the National Conference on Planning for War and Post-War Medical Services. J.A.M.A. 122, 1:1 (May 1), 1943.

As Others See Us—Praise-Singing Department—An English visitor charitably tells all that he found good in our courses in public health—both in undergraduate and in graduate medical schools—and concludes that the British educational practice may have something to learn from us.

MACKINTOSH, J. M. The Teaching of Preventive Medicine in the United States. Public Health. 56, 6:65 (Mar.), 1943.

"Boilermaker's Ear"—Plastic ear plugs molded to fit the individual's ear canal are suggested for workers in noisy industries. These plugs shut out the ear shattering, deafening, high-frequency noises, yet permit conversation.

McCoy, D. A. The Prevention of Ear Disability in Industry. J.A.M.A. 121, 17:1330 (Apr. 24), 1943.

Glad Tidings for the Middle Aged —Hypertension is so common after 40 that a "moderate" degree can no longer be considered abnormal. Normal limits should be raised, concludes this paper.

MASTER, A. M., *et al.* Hypertension in People of Forty. J.A.M.A. 121, 16:1251 (Apr. 17), 1943.

"Them as Has, Gets"—There were fewer physicians per capita and a greater proportion of old-timers in poorer than in wealthy counties, and as might be expected, the rich counties are getting richer in young physicians and the poor, even poorer in all kinds.

MOUNTIN, J. W., *et al.* Location and Movement of Physicians, 1923 and 1938—Age Distribution in Relation to County Characteristics. Pub. Health Rep. 58, 12:483 (Mar. 19), 1943.

S. D. R. I. P.—Do you remember recent newspaper accounts of the "cure of cancer with egg white"? Well, here is a report that the treatment was with-

out effect upon two dissimilar cancer cases for which it was tried. This paper seems to indicate that what is needed these days is a S.D.R.I.P. (Society for the Discouragement of Rushing into Print).

RHOADS, C. P., and ABELS, J. C. The Administration of Egg White and Avidin Concentrates to Patients with Cancer. J.A.M.A. 121, 16:1261 (Apr. 17), 1943.

BOOKS RECEIVED

MIRACLES OF MILITARY MEDICINE. By Albert Q. Maisel. New York: Duell, Sloan & Pearce, 1943. 373 pp. Price, \$2.75.

VICTORIES OF ARMY MEDICINE. By Edgar Erskine Hume. Philadelphia: Lippincott, 1943. 250 pp. Price, \$3.00.

CLINICAL SIGNIFICANCE OF THE BLOOD IN TUBERCULOSIS. By Gulli Lindh Muller. New York: Commonwealth, 1943. 516 pp. Price, \$3.50.

A MANUAL OF PULMONARY TUBERCULOSIS (PART I) AND AN ATLAS OF THORACIC ROENTGENOLOGY (PART II). By David O. N. Lindberg. Springfield: Thomas, 1943. 231 pp. Price, \$6.50.

THE KENNY CONCEPT OF INFANTILE PARALYSIS AND ITS TREATMENT. By John F. Pohl in Collaboration with Sister Elizabeth Kenny. Minneapolis: Bruce, 1943. 366 pp. Price, \$5.00.

PUBLIC HEALTH AND PREVENTIVE MEDICINE. By Morton C. Kahn. New York: Oxford, 1942. 2 Vols. \$4.00.

THE CANADIAN BORN IN THE UNITED STATES. By Leon E. Truesdell. New Haven: Yale, 1943. 263 pp. Price, \$3.00.

ESSENTIALS OF INDUSTRIAL HEALTH. By C. O. Sappington. Philadelphia: Lippincott, 1943. 626 pp. Price, \$6.50.

FOOD FOR PEOPLE. By Margaret G. Reid. New York: Wiley, 1943. 653 pp. Price, \$4.00.

AN INTRODUCTION TO GROUP THERAPY. By S. R. Slavson. New York: Commonwealth, 1943. 352 pp. Price, \$2.00.

DISCOVERING OURSELVES. By Edward A. Strecker and Kenneth E. Appel. 2d Ed.

New York: Macmillan, 1943. 434 pp. Price, \$3.00.

A FAMILY OF THIRTY MILLION. The Story of the Metropolitan Life Insurance Company. By Louis I. Dublin. New York: Metropolitan Life Insurance Co., 1943. 496 pp.

BROWNELL AND WILLIAMS. Health of our Nation Series. 1943.

Elementary Books:

Book V. Hale and Hearty..... \$0.96

Book VI. Active and Alert..... .96

Book VII. Living and Doing..... 1.00

Health Problems—How to Solve

Them 1.50

Youth Faces Maturity..... .20

New York: American Book Company.

A STUDY IN PUBLIC RELATIONS. By Harold P. Levy. New York: Russell Sage, 1943. 165 pp. Price, \$1.00.

SOCIAL HYGIENE YEAR BOOK 1942. The Program in Action in the States and Communities. New York: American Social Hygiene Association, 1943. 241 pp. Price, \$1.00.

GUIDE TO THE INTER-AMERICAN CULTURAL PROGRAMS OF NON-GOVERNMENT AGENCIES IN THE UNITED STATES. Washington, D. C.: The Office of the Coordinator of Inter-American Affairs.

SIXTY-SECOND ANNUAL REPORT OF THE DEPARTMENT OF HEALTH FOR THE YEAR ENDING DECEMBER 31, 1941. Vol. I. Albany: Edward S. Godfrey, Jr., M.D., Commissioner.

CAREERS IN PUBLIC HEALTH. By Adrian G. Gould. Chicago: Research Associates, 1943. 48 pp. Price, \$0.60.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND SEVENTY-SECOND ANNUAL BUSINESS MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

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Laboratory Section

Gladys E. Duffy, M.A., Jeffery Hale's Hospital, Quebec, P. Q., Canada, Technician.
Elizabeth A. Garrison, 215 E. 12th St., Marysville, Calif., Laboratory Technician, Sutter-Yuba Bi-County Health Unit.
Faith F. Gaston, M.S., Health Dept., Court House, Kelso, Wash., Senior Bacteriologist.
Nancy K. V. Green, M.S., State Hygienic Laboratory, Jackson, Miss., Bacteriologist.
Thomas G. Maynard, State Dept. of Public Health, Springfield, Ill., Asst. Milk Sanitarian.
Lieut. Thomas W. Mou, M.A.C., Base Hospital, Army Air Base, Alliance, Nebr., Laboratory Officer.

Vital Statistics Section

Paul W. Shipley, New Orleans, La., Assoc., Public Health Representative, U.S.P.H.S., and Chief, Tabulation Section, State Dept. of Health.

Engineering Section

Cleon C. Bullock, 144 Wilbur St., Mesa; Ariz., Sanitary Officer, Mesa Health Dept.
 R. C. Burkhardt, Mims Court, Huntsville, Ala., Senior Sanitarian, State Health Dept.
 Duard F. Campbell, Dept. of Public Health, Boise, Ida., Milk Sanitarian.
 Walter M. Culley, C.E., Surgeons Office, Second Service Command, Governors Island, N. Y., Sanitary Engineer.
 Theodore C. Hill, C.E., 144 East Main St., North East, Pa., Design Engineer, Gannett, Eastman & Fleming.
 Prof. Edward J. Kilcawley, M.C.E., Rensselaer Polytechnic Institute, Dept. of Civil Engineering, Troy, N. Y., Professor of Soil Mechanics and Sanitary Engineering.
 Howard McGuire, 509 W. Clark St., Champaign, Ill., Sanitarian, State Dept. of Public Health.
 Alfred H. Paessler, M.S., 4300 Avenue D., Austin, Tex., Acting Supt. of Water and Sewage Treatment Plants.
 Joseph Allen Radbury, 1432 E. McKinley, Phoenix, Ariz., Sanitary Food Inspector, City Health Dept.
 Roy Edwin Ramseier, C.P.H., 852 S. 19th East, Salt Lake City, Utah, Senior Sanitary Engineer, Pacific Division, U. S. Eng. Dept.
 Perry C. Sharp, 852 U. S. Custom House, Chicago, Ill., Asst. Sanitary Engineer (R) U.S.P.H.S.
 C. H. Watson, Bannock County Health Unit, Pocatello, Ida., Sanitarian.

Industrial Hygiene Section

Capt. Thomas F. Feltz, M.C., Desert Chemical Warfare Depot, Tooele, Utah, Director of Industrial Hygiene and Post Surgeon.
 Edwin C. Hyatt, 1902 N. Circle Drive, Jefferson City, Mo., Industrial Hygiene Engineer, State Board of Health.
 Melville H. Manson, M.D., 140 West St., New York, N. Y., Medical Director, New York Telephone Co.
 Margaret J. Nicols, M.A., Div. of Industrial Hygiene, State Dept. of Labor, Syracuse Univ., Syracuse, N. Y., Assoc. Public Health Nursing Consultant, U.S.P.H.S.
 Hugh L. Parker, M.S., 143 Lyle St., College Park, Ga., Industrial Hygiene Chemist, Industrial Hygiene Service, State Health Dept.
 Capt. John J. Ritter, M.A.C., APO 837, c/o Postmaster, New Orleans, La., Venereal Disease Control, U. S. Army.

Bonnie J. Sewell, R.N., 1050 Gaviota St., Long Beach, Calif., Student.

Food and Nutrition Section

Dr. Oswaldo Lopes da Costa, National Dept. of Health, Praca Mal Ancora, Rio de Janeiro, Brazil, S. A., Chief, Section on Nutrition.
 Earl A. Louder, Ph.D., Pet Milk Co., Greenville, Ill., Technical Director.
 Mabel Perry Polan, M.S., State Health Dept., Austin, Tex., Senior Nutritionist.
 Harold R. Sandstead, M.D., 15 Pine St., Sub-Treasury Bldg., New York, N. Y., P.A. Surgeon, U.S.P.H.S.
 Paul F. Sharp, Ph.D., 425 Battery, San Francisco, Calif., Director of Research, Golden State Co., Ltd.
 John M. Sherbeck, Health Dept., City Hall, Bay City, Mich., Sanitarian.
 Ansta Todd, M.S., Capitol Annex Bldg., Phoenix, Ariz., Nutrition Consultant, State Dept. of Health.
 Eleanor M. Wilkinson, M.S., State Board of Health, State House, Dover, Del., Nutritionist.

Maternal and Child Health Section

Wesley N. Segre, M.D., Flint-Goodridge Hospital, New Orleans, La., Obstetrician, School of Nurse-Midwifery.
 Mary E. Soules, M.D., M.P.H., 504 3rd St., Bismarck, N. D., Asst. Director, Maternal and Child Health, State Dept. of Health.

Public Health Education Section

Lillian C. Christensen, M.Ed., 133 Dorchester St., South Boston, Mass., Health Educator, Boston Health Dept.
 Armand J. Courchaine, R.N., 4516 Baltimore Ave., Philadelphia, Pa., Science Instructor, Hahnemann Hospital School of Nursing.
 Alma B. Fringer, 216 Rockford News Tower, Rockford, Ill., Exec. Secy., Winnebago County Tuberculosis Assn.
 Alice M. Heath, 1018 N. Jefferson St., Milwaukee, Wis., Health Education Consultant, Wisconsin Anti-Tuberculosis Assn.
 Ellen Kuhlmann, Box 544, Sharon, Pa., Exec. Secy., Mercer County Tuberculosis and Public Health Society.
 Helen P. Olmstead, R.N., C.P.H., Room 401, P. O. Bldg., Oklahoma City, Okla., Field Nurse Supervisor, U. S. Indian Service.
 Russell E. Shrader, M.A., 812 Littlefield Bldg., Austin, Tex., Merit System Supervisor, State Dept. of Health.
 Taylor Smith, M.D., 35790 Detroit Rd., Avon, Ohio, Member, Lorain County Health Committee.
 Ella T. Whitten, R.N., City Health Dept., 9

Ontario St., Toledo, Ohio, Supervisor of School Nursing.

Public Health Nursing Section

Mabel F. Chrystie, R.N., 519 Smithfield St., Pittsburgh, Pa., Asst. Director, Public Health Nursing Assn.

Gertrude M. Clouse, R.N., State Board of Health, Fond du Lac, Wis., State Advisory Nurse.

Evelyn A. Conner, R.N., 302 N. Madison St., Quitman, Ga., Brooks County Health Nurse.

Mary McR. Corpening, R.N., 206 S. John St., Goldsboro, N.C., Supervising Nurse, Wayne County Health Dept.

Neoma S. Crynock, R.N., 436 Stewart St., Morgantown, W. Va., Industrial Nurse, Koppers Coal Co.

Avis J. Dykstra, R.N., Martha Cook Bldg., Ann Arbor, Mich., Student, Univ. of Michigan.

Edith J. Eyster, R.N., 808 N. Spring St., Los Angeles, Calif., Supervising Public Health Nurse, Los Angeles County Health Dept.

Florence Cox Goodwin, R.N., 1304 Main St., Clarkdale, Ariz., Public School Nurse.

Helen L. Hendricks, R.N., Tishoming County Health Dept., Iuka, Miss., Staff Nurse.

Geraldine Hiller, M.A., Johnson Road, Falmouth Foreside, Me., Supervisor, Div. of Nursing, State Bureau of Health.

Pearl S. Kirkpatrick, R.N., Nevada St., Gooding, Ida., Gooding County Public Health Nurse.

Claudia M. D. Mangham, 419 E. 48th Place, Chicago, Ill., Public Health Field Nurse, Cook County Public Health Unit.

Vera E. Roswell, 110½ W. Oak St., Sparta, Wis., Advisory Public Health Nurse, State Board of Health.

Mildred B. Saunders, 816 Montrose Drive, South Charleston, W. Va., Industrial Nurse, Westvaco Chlorine Products Corp.

Leta Seaman, 1145-66th St., Des Moines, Ia., Consultant Nurse, State Dept. of Health.

Florence M. Watson, 11 Philadelphia Ave.,

Takoma Park, D. C., Staff Nurse, Instructive Visiting Nurse Society.

Helen L. Woodworth, 1337 Linda Vista Ave., Pasadena, Calif., Director of Nursing Service, Pasadena Visiting Nurse Assn.

Epidemiology Section

LeRoy D. Fothergill, M.D., U. S. Naval Medical Center, Bethesda, Md., Head, Dept. of Epidemiology.

Gerald F. Gagnon, 414 Walnut, Buena Park, Calif., Qualified Asst., Epidemiology-Sanitation, U. S. Navy.

Luis De J. Lozano-Mendoza, Calle Sta. Maria la Ribera 1-A, Mexico City, Mexico, Supervisor, Public Health Dept., Zone VIII (States of Michoacan and Guerrero).

Unaffiliated

Ernest G. Lion, M.D., 33 Hunt St., San Francisco, Calif., Director, Psychiatric Service, City-County Health Dept.

Philip Lomas, 122 W. 69th St., Los Angeles, Calif., Meat Inspector, City Health Dept.

Russel G. Means, M.D., 40 S. 3rd St., Columbus, Ohio, Member, Ohio Public Health Council.

Lawrence E. Shulman, 290 Congress Ave., New Haven, Conn., Research Assoc., Laboratory of Hygiene, John B. Pierce Foundation.

Richard M. Starr, M.D., 45 Huntington St., New London, Conn., Health Officer, Town of Waterford.

A. C. Woofert, M.D., State Dept. of Health, Des Moines, Ia., Acting Director, Division of Venereal Disease Control, State Dept. of Health, P.A. Surgeon, U.S.P.H.S.

DECEASED MEMBERS

A. Grant Fleming, M.D., D.P.H., McGill University, Montreal, Canada. Elected Member 1920, Elected Fellow 1930, Elected Life Member 1934, Epidemiology Section.

Paul D. Robason, M.D., McKinney, Tex. Elected Member 1942, Health Officers Section.

SCHOOL HEALTH SECTION WORKSHOPS

Establishment of a new Section on School Health by action of the Governing Council has already been announced. The officers of the Section, Leona Baumgartner, M.D., *Chairman*, and George M. Wheatley, M.D., *Secretary*, hope to have as an essential feature of the Section's activities workshops which will deal with fundamental "grass roots"

problems of school health. They invite members of the Association to contribute suggestions for the future work of the Section and for specific problems in which they would be willing to contribute materials and work actively. Send suggestions directly to Leona Baumgartner, M.D., Department of Health, 125 Worth Street, New York, N. Y.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

Southern state department of health seeks several obstetric and pediatric consultants, requiring a minimum of a year's residency in a specialty, immunity to draft and preferably training in public health. Men and women are eligible. Salary \$300 per month plus travel. Apply Box C, Employment Service, A.P.H.A.

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations

will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Wanted: School Dental Supervisor to administer and operate dental program in City schools and clinics in City of 50,000 population. Salary \$3,000 to \$3,600 with travel allowance. Those interested should address Dr. W. A. Browne, City Health Department, Alexandria, Va.

The Milwaukee City Service Commission announces an examination for assistant chief in charge of sanitary inspection. Salary first year \$210 per month increasing by \$10 increments annually until a maximum of \$260 per month is reached. Applicants must be citizens of the United States, between 25 and 45 years of age. Those interested may communicate with the Milwaukee City Service Commission, Room 716, City Hall, Milwaukee, Wis.

Sanitarian wanted in county of 28,000 in Midwest. Salary \$1,800 plus \$500 travel. Must own car. Complete supervision and execution of sanitation program, including milk, water, food-handling, etc., and general sanitation of environment in county. Address Box I, Employment Service, A.P.H.A.

Merit System for Personnel Administration, Delaware, is accepting applications for position of Deputy State Health Officer in Delaware State Board of Health.

Salary range \$3,600 to \$4,200. Applications accepted until further notice. Those interested should communicate with Merit System Supervisor, P. O. Box 1911, Wilmington, Delaware, or State Board of Health, Dover, Del.

THE MERIT SYSTEM COUNCIL OF WEST VIRGINIA
ANNOUNCES UNASSEMBLED EXAMINATIONS
FOR THE FOLLOWING POSITIONS IN THE WEST
VIRGINIA STATE HEALTH DEPARTMENT

| <i>Position</i> | <i>Salary</i> |
|--|-----------------|
| Director of Maternal and Child Hygiene | \$4,200-\$4,800 |
| Assistant Director, Maternal and Child Hygiene.. | 3,840- 4,500 |
| Director, Industrial Hygiene | 4,200- 4,800 |
| Director, Vital Statistics... | 4,200- 4,800 |
| Director, Communicable Diseases | 4,200- 4,800 |
| Assistant Director of Communicable Diseases (Tuberculosis) | 3,840- 4,500 |
| Assistant Director of Communicable Diseases (Venereal Disease) | 3,840- 4,500 |
| Venereal Disease Consultant | 3,840- 4,500 |
| Director, Bureau of Dental Hygiene | 3,840- 4,500 |
| Director of County Health Work | 4,200- 4,800 |
| Senior Health Officer..... | 3,840- 4,500 |
| Junior Health Officer..... | 3,360- 3,840 |
| Health Officer Trainee.... | 2,400 |
| Assistant Director, Hygienic Laboratory | 2,640- 3,240 |
| Senior Bacteriologist | 1,800- 2,400 |
| Senior Serologist | 1,800- 2,400 |
| Consultant Nurse in Special Fields | 2,400- 3,000 |
| Public Health Nursing Supervisor (State level)... | 1,920- 2,400 |
| Public Health Nursing Supervisor (Local level)... | 1,800- 2,040 |
| Chief of Medical Services.. | 4,800- 5,280 |

Persons interested should make application to the Merit System Council, 212 Atlas Building, Charleston, W. Va.

Residence in West Virginia has been waived. Applications will be accepted continuously but new registers will be established from applicants who file no later than June 26, 1943.

Notice of an expected vacancy for an Industrial Hygiene Engineer in the Los Angeles County Health Department has been received. Those interested should communicate with Dr. H. O. Swartout, Acting County Health Officer, Los Angeles, Calif.

Announcement is made of the following examinations to be held by the State Personnel Board, Seattle, Wash., for positions in the State Department of Health and County Health Departments:

| <i>Position</i> | <i>Salary Range</i> | |
|--|---------------------|----------------|
| | <i>Entrance</i> | <i>Maximum</i> |
| Bacteriologist | \$135 | \$160 |
| Laboratory Assistant .. | 125 | 145 |
| District Public Health Officer, II | 325 | 425 |
| Public Health Nurse... | 145 | 170 |
| Asst. Venereal Disease Investigator | 150 | 190 |
| General Sanitarian | 160 | 200 |
| Milk Sanitarian | 160 | 200 |
| Chief of Public Health Education | 275 | 335 |
| Senior Milk Sanitarian.. | 190 | 230 |
| Obstetric Consultant ... | 375 | 450 |
| Pediatric Consultant ... | 375 | 450 |
| Senior Bacteriologist ... | 160 | 200 |
| Assistant Sanitarian (Open to Men and Women) | 125 | 150 |

The New York State Department of Civil Service announces examinations for the following positions:

Resident Physician (T.B.) (No. 6051) Department of Public Welfare, Westchester County. Salary range \$2,640-\$3,000. Application fee \$2.

Statistician (No. 6050) Department of Health, Westchester County. Salary range \$2,700-\$3,420. Application fee \$2.

Public Health Nurse (No. 6052) Westchester County. Salary range \$1,800-\$2,160. Application fee \$1.

Intermediate Medical Social Worker (No. 6053) Department of Public Welfare, Westchester County. Salary range \$1,560-\$1,920.

The examinations are open to both residents and non-residents of the State, but applicants must be citizens of the United States. Applications with required fees must be submitted to the New York State Department of Civil Service, Albany, by June 15. In writing for application forms candidates should specify by number and title the position for which they wish to be examined.

Wanted: Bacteriologist-Biologist. Ph.D. or equivalent. For research in chemotherapy and allied fields with pharmaceutical manufacturing company. New York area. Box L, Employment Service, A.P.H.A.

Assistant Vital Statistician wanted by outstanding private health agency, New York City. Salary \$3,000 per annum. Apply stating education, special training and practical experience. Box N, Employment Service, A.P.H.A.

Sanitarian wanted: Starting salary \$1,800 per year with travel allowance of \$50 per month. Man must have own car. Bachelor's degree followed by at least one year's course or its equivalent in subjects necessary for one entering the public health field, or an engineering degree plus one year's experience in sanitary or public health engineering required. A course in public health training may be considered as an equivalent for a part of

the experience requirement. Apply Dist. Dept. of Health No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Wanted: Two physicians, immediate appointment, full-time venereal disease clinician, conduct several small clinics rotating schedule. Experience preferred. Salary \$3,600 plus actual expense not to exceed \$1,200. Write State Health Department, Santa Fe, New Mexico.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

Physician, age 36, M.D. Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. A-476

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. A-505

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as city or county health officer or director of a bureau. A-506

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and bacteriologist and serologist in syphilis and enteric diseases. L-465

M.D., Dr.P.H., now a practising physician, chief of a clinic, diplomate in his specialty, professor in a medical school, ineligible for military service but in good health, wishes to make a change in his work and be employed in war industry. A-504

NEWS FROM THE FIELD

STATE HEALTH OFFICERS

MAY, 1943

- ALABAMA—†Burton F. Austin, M.D., State Health Officer, Montgomery
 ARIZONA—†George F. Manning, M.D., State Superintendent of Public Health, Phoenix
 ARKANSAS—*William B. Grayson, M.D., State Health Officer, Little Rock
 CALIFORNIA—*Wilton L. Halverson, M.D., Director of Public Health, Sacramento
 COLORADO—*Roy Leon Cleere, M.D., Secretary, State Board of Health, Denver
 CONNECTICUT—*Stanley Hart Osborn, M.D., State Commissioner of Health, Hartford
 DELAWARE—*Edwin M. Cameron, M.D., Executive Secretary, State Board of Health, Dover
 FLORIDA—*Henry Hanson, M.D., State Health Officer, Jacksonville
 GEORGIA—Thoms F. Abercrombie, M.D., State Commissioner of Health, Atlanta
 IDAHO—†Ernest L. Berry, M.D., Director of Public Health, Boise
 ILLINOIS—†Roland R. Cross, M.D., State Director of Health, Springfield
 INDIANA—†Thurman B. Rice, M.D., State Health Commissioner, Indianapolis
 IOWA—*Walter L. Bierring, M.D., State Health Commissioner, Des Moines
 KANSAS—†Floyd C. Beelman, M.D., Secretary, State Board of Health, Topeka
 KENTUCKY—*Arthur T. McCormack, M.D., State Health Commissioner, Louisville
 LOUISIANA—David E. Brown, M.D., President, State Board of Health, New Orleans
 MAINE—†Roscoe L. Mitchell, M.D., Director, State Bureau of Health, Augusta
 MARYLAND—*Robert Hickman Riley, M.D., State Director of Health, Baltimore
 MASSACHUSETTS—†Vlado A. Getting, M.D., Dr.P.H., State Commissioner of Public Health, Boston
 MICHIGAN—†Henry A. Moyer, M.D., State Health Commissioner, Lansing
 MINNESOTA—*Albert J. Chesley, M.D., Secretary, State Board of Health, St. Paul
 MISSISSIPPI—*Felix J. Underwood, M.D., Executive Officer, State Board of Health, Jackson
 MISSOURI—†James Stewart, M.D., State Health Commissioner, Jefferson City
 MONTANA—*William F. Cogswell, M.D., Secretary, State Board of Health, Helena
 NEBRASKA—†Claude A. Selby, M.D., State Director of Health, Lincoln
 NEVADA—Edward E. Hamer, M.D., Secretary, State Board of Health, Carson City
 NEW HAMPSHIRE—†Alfred L. Frechette, M.D., Secretary, State Board of Health, Concord
 NEW JERSEY—†J. Lynn Mahaffey, M.D., State Director of Health, Trenton
 NEW MEXICO—*James Robt. Scott, M.D., State Director of Public Health, Santa Fe
 NEW YORK—*Edward S. Godfrey, Jr., M.D., State Commissioner of Health, Albany
 NORTH CAROLINA—*Carl V. Reynolds, M.D., State Health Officer, Raleigh
 NORTH DAKOTA—†Frank J. Hill, M.D., State Health Officer, Bismarck
 OHIO—*Roll Harrison Markwith, M.D., State Director of Health, Columbus
 OKLAHOMA—†Grady Frederick Mathews, M.D., State Health Commissioner, Oklahoma City
 OREGON—*Frederick D. Stricker, M.D., State Health Officer, Portland
 PENNSYLVANIA—†Alexander A. Stewart, M.D., Secretary of Health, State Department of Health, Harrisburg
 RHODE ISLAND—†Edward A. McLaughlin, M.D., State Director of Public Health, Providence
 SOUTH CAROLINA—*James A. Hayne, M.D., State Health Officer, Columbia
 SOUTH DAKOTA—†W. R. Giedt, M.D., M.P.H., Acting State Superintendent of Health, Pierre
 TENNESSEE—*Wilson C. Williams, M.D., State Commissioner of Public Health, Nashville
 TEXAS—†George Washington Cox, M.D., State Health Officer, Austin
 UTAH—†William M. McKay, M.D., State Health Commissioner, Salt Lake City
 VERMONT—Charles F. Dalton, M.D., Secretary, State Board of Health, Burlington
 VIRGINIA—†Irl Cophas Riffin, M.D., State Health Commissioner, Richmond
 WASHINGTON—*Donald G. Evans, M.D., State Director of Health, Seattle
 WEST VIRGINIA—†Clifton F. McClintic, M.D., State Commissioner of Health, Charleston
 WISCONSIN—†Carl N. Neupert, M.D., State Health Officer, Madison
 WYOMING—†Marshall C. Keith, M.D., State Health Officer, Cheyenne

* Fellow A.P.H.A.

† Member A.P.H.A.

AMERICAN SOCIAL HYGIENE ASSOCIATION
NEW STAFF MEMBERS

Raymond H. Greenman,* assigned as field consultant in one of the Army Service Commands. Mr. Greenman has been in public health work since 1919, serving 19 years as executive secretary of the Tuberculosis and Health Association of Rochester and Monroe County, N. Y., and for 10 years also as executive secretary of the Medical Society of the County of Monroe.

Wade T. Searles, assigned as field consultant in one of the Army Service Commands. Mr. Searles was formerly a senior adviser on war services for the Office of Civilian Defense and a member of the faculty of Indiana University, and has had wide experience in welfare and public health fields while employed by the unemployment and transient relief agencies in Dayton, Ohio; the Dayton Public Health Clinic; and the Indiana State Conference on Social Work.

Edna W. Fox, R.N., M.P.H., assigned as field consultant in one of the Army Service Commands. Since 1914 Mrs. Fox has been engaged in work with the Rockefeller Institute, the American Red Cross, the American Tientsin School in Tientsin, China, and assisting her husband, Brig. Gen. A. Fox, M.C., in editing and publishing articles on epidemiology and preventive medicine.

Charles E. Miner, assigned as field consultant in one of the Army Service Commands. Mr. Miner was in charge of the venereal disease control program in all extra-cantonment areas in five southeastern states in World War I and later served as executive officer of the Committee of Sixteen at Erie, Pa.; the Missouri Social Hygiene Association; and as General Director of the Committee of Fifteen at Chicago. More recently he has been State WPA Administrator for Illinois, Regional Director for 13 central states of the Post War Program for state and local works,

and field representative for the Illinois Emergency Relief Commission.

Josephine D. Abbott, assigned as consultant to study delinquency problems. Mrs. Abbott comes to the association from the Division of Child Hygiene of the Massachusetts State Department of Health, where she was a consultant in parent education. As director of the Family Information Center at the Jordan Marsh Company in Boston; and as a clinical psychologist and educational lecturer; consultant in child management; Mrs. Abbott has special experience in the field of parent education, child psychology, and child guidance.

Thomas A. Larremore, assigned as legal consultant at American Social Hygiene Association headquarters. Mr. Larremore, a lawyer, served on the staff of the association from 1917 to 1920, and in the United States Army. He has been a member of the faculties of several law schools. He comes to the association again from private legal work.

Kenneth Miller,† assigned to a special education project is loaned to the association on a part-time basis by the Philadelphia Tuberculosis and Health Association, where he is director of the local educational and publicity program.

Shirley Greene,† assigned to work in the association's publication division was formerly with the Queensboro Tuberculosis and Health Association and the Newburgh Public Health and Tuberculosis Association. Mrs. Greene is a graduate of Hunter College and the Yale School of Public Health.

Isabel H. Collins, assigned to do educational work with Dr. Snow and Professor Bigelow. Mrs. Collins formerly was Assistant to the Secretary of the Social Hygiene Committee of the New York Tuberculosis and Health Association and comes to the association from Washington, D. C., where she worked as Health Education As-

sistant of the Social Hygiene Society of the District of Columbia.

UNIFORM DEFINITIONS OF MOTOR VEHICLE ACCIDENTS

The U. S. Département of Commerce has announced the publication of a pamphlet on Uniform Definitions of Motor Vehicle Accidents which was prepared under the supervision of Halbert M. Dunn, M.D., Chief Statistician for Vital Statistics of the Bureau of the Census, by Iwao M. Moriyama, Associate Biometrician. The Committee on Definitions of the National Conference on Uniform Traffic Accident Statistics included Dr. Dunn as Chairman, Dr. Earle G. Brown of Mineola, N. Y., Dr. E. R. Coffey, Assistant Surgeon General, U. S. Public Health Service, Dr. Edward S. Godfrey, Jr., New York State Commissioner of Health and Robert J. Vane of the Metropolitan Life Insurance Company representing the American Public Health Association, among others.

This report, which is available through the Bureau of the Census for distribution, has been approved by the American Public Health Association, the American Association of Motor Vehicle Administrators, the Conference of State and Provincial Health Authorities of North America, and the U. S. Public Health Service, among other agencies.

A STUDY OF MEDICINE AND THE CHANGING ORDER

The New York Academy of Medicine has announced the formation of a committee whose objectives will include being informed on the quality and direction of the economic and social changes that are taking place now and that are clearly forecast by the immediate future. The result will help to define how these changes are likely to help medicine in its various aspects and to determine how the best elements of the

science of medicine and its service to the public may be preserved and embodied in whatever changed social order may ultimately develop.

The Chairman of the committee is Dr. Malcolm Goodridge and among members are the following with interests in public health: James Alexander Miller, M.D., Alan Gregg, M.D., George Baehr, M.D., I. Ogden Woodruff, M.D., Wilson G. Smillie, M.D., Jean Curran, M.D., and Iago Galdston, M.D., Secretary.

AWARD TO DR. FLORENCE SEIBERT

The American Association of University Women has announced the presentation in April of its first Achievement Award in the amount of \$2,500 to Dr. Florence Seibert, Associate Professor of Biochemistry in the Phipps Institute, University of Pennsylvania. Dr. Seibert for years has been active in research relating to tuberculosis and in particular in the preparation of the purified protein derivatives.

THE BELA SCHICK LECTURES

The first Bela Schick lecture under a fund created in 1942 by the friends and associates of Dr. Bela Schick, New York, N. Y., was presented recently at Mt. Sinai Hospital, New York, by William E. Ladd, M.D., Professor of Child Surgery in the Harvard Medical School, Boston, on the subject of Time and Choice of Operation in Early Life.

NICHOLAS APPERT MEDAL AWARDED TO PROFESSOR S. C. PRESCOTT

The Chicago Section of the Institute of Food Technologists has announced that its Nicholas Appert Medal has been awarded to Professor Samuel Cate Prescott, Emeritus Dean of Science, Massachusetts Institute of Technology, Cambridge. The medal is to be presented on June 3 at the meeting of the Institute in St. Louis, Mo.

Since his retirement in June, 1942, as

Dean of Science at M.I.T., Professor Prescott has been called in to consulting service by the Dehydration Committee of the U. S. Department of Agriculture and by the Research Laboratories of the National Canners Association.

U. S. PUBLIC HEALTH SERVICE FEATURED
IN RKO "THIS IS AMERICA" FILM

Dr. Carl E. Rice, currently in charge of the Community Medical and Dental Section of the U. S. Public Health Service at Bathesda, Md., is featured in RKO's "Medicine On Guard," which tells the story of the typical wartime community faced by urgent health problems arising from the shortage of doctors. Dr. Rice works in close coöperation with the Procurement and Assignment Service of the War Manpower Commission and, on request will arrange the relocation of a doctor from a less critical area. This latest "This Is America" two reel feature depicts the rising incidence of tuberculosis in a typical industrial community. Under the direction of Dr. Herman E. Hilleboe, this menace is being checked through the use of the mobile photo-fluorographic units which are set up in the factories themselves and take chest plates of the workers with a minimum of time loss and expense. The elaborate laboratories of the Division of Industrial Hygiene under the direction of Dr. James G. Townsend are shown determining the causes of occupational disabilities.

DR. WILINSKY RECEIVES BOSTON CITY
CLUB MEDAL

Charles F. Wilinsky, M.D., Chief Medical Officer of the Boston Public Safety Committee, Director of Beth Israel Hospital, and Deputy Commissioner of Health of Boston, was recently awarded the medal of the Boston City Club for "most outstanding civic service to Greater Boston in 1942."

This medal is presented annually to

the resident of Greater Boston not holding an elective position, who has performed in the opinion of the club the most meritorious service for the welfare of Bostonians. The selection of Dr. Wilinsky was the outcome of his work in organizing the medical section of the Boston civilian defense effort and for his work during the Cocoanut Grove disaster.

UNIVERSITY OF TEXAS RECEIVES GRANT
FOR CHILD HEALTH

The William Buchanan Foundation of Texarkana has announced a grant to the University of Texas Medical School of \$200,000 covering a 5 year program on child health. It is reported that the program will be worked out in conjunction with the Department of Pediatrics which will correlate the work of other state and national agencies. "Its purpose is to afford the profession in Texas an opportunity to maintain the latest methods in connection with the promotion of child health, especial attention to be given to the problems of the adolescent in wartime."

CHARLES F. BOLDUAN, M.D., RETIRES

The retirement of Charles F. Bolduan, M.D., as Director of the Bureau of Health Education in the New York City Department of Health, effective June 1, has been announced. On May 20 his friends and associates tendered to Dr. Bolduan a dinner in his honor in New York.

OCD PLAN FOR EMERGENCY MEDICAL
SERVICE IN INDUSTRIAL PLANTS

Emergency Medical Service for Industrial Plants, a new bulletin issued by the Medical Division of the Office of Civilian Defense, advises every plant medical department to prepare a "disaster operations plan" to provide adequate medical service in case of a plant catastrophe involving large numbers of casualties.

The plan should provide for necessary first aid care at the site of the incident, for adequate ambulance service, and for hospitalization of the seriously injured, it is stated.

The bulletin discusses casualty stations, the importance of identification and records, transportation, the organization and operation of protective services in a community, and the overall protective services recommended for industrial plants. A bibliography of pertinent material is included.

SURGEON GENERAL'S ANNUAL REPORTS DISCONTINUED

Dr. E. R. Coffey, of the Division of Sanitary Reports and Statistics, U. S. Public Health Service, announces the decision of the Office of War Information to suspend publication of the *Annual Reports of the Surgeon General* for the duration of the war.

OFFICE OF COMMUNITY WAR SERVICES ESTABLISHED

By executive order of the President on April 30, the Office of Community War Services was established in the Federal Security Agency, eliminating the Office of Defense Health and Welfare Services. Federal Security Administrator Paul V. McNutt has announced that Charles P. Taft becomes Director of Community War Services in the new organization.

The Office of Community War Services, like its predecessor, is the federal agency concerned in health, medical care, welfare, recreation, education, and related services. It includes Divisions for Recreation, Social Protection, and Day Care for children of women in war work. It also serves as the center for coordinating health and welfare services available through federal and other public and private agencies which can help communities meet wartime needs in these fields; and offers states and localities the services of health and wel-

fare specialists to assist in planning and developing their community programs.

The President's executive order also established a Committee on Physical Fitness in the Federal Security Agency. John B. Kelly is Chairman. The committee is charged with carrying on a nation-wide promotional program, in cooperation with national, state, and local organizations, and for providing advice and assistance to communities in developing and carrying out plans to promote the interest of individuals in improving their own physical condition.

NEW DUTIES FOR CIVILIAN PHYSICIANS ORGANIZED FOR CIVILIAN DEFENSE

Temporary assistance to the Army if it is unable to handle a sudden influx of war casualties or some other military emergency in War Department hospitals will be given by units of civilian physicians organized for Civilian Defense. "Affiliated hospital units" have already been organized by OCD and the U. S. Public Health Service in coastal areas, and will be expanded to include more than 200 hospitals throughout the country, at the request of the War Department. Each unit consists of 15 doctors normally associated with a single hospital, and the units will be used in military emergencies in or near the communities in which the staff resides.

Physicians accepted for service with the affiliated hospital units receive reserve commissions in the U. S. Public Health Service, but will be called to active duty by the Surgeon General only at the call of the OCD. When a unit is needed, either to staff an OCD emergency base hospital or to assist the Army temporarily in a military emergency, the physicians of the unit will be placed on active duty for the duration of that particular emergency, and receive the pay and allowance of medical officers of equivalent rank in the Army. They will return to inactive

status as soon as they can be replaced by Army medical officers.

Initially, only hospitals and medical schools in the areas considered in most immediate danger of enemy attack were invited to form these units, but to meet the Army's request for their availability in an unexpected emergency, such units will now be formed throughout the country.

Dr. George Baehr, Chief Medical Officer of the U. S. Office of Civilian Defense, reported that, by April 22, unit directors had been nominated by 152 of the hospitals and medical schools in coastal areas previously invited to form units, and that 104 of these had been commissioned.

MANHATTAN COLLEGE FOOD HANDLING COURSE

On June 7, a free course in sanitation problems in food handling and processing begins at the School of Engineering of Manhattan College, New York, N. Y. It will run for 6 weeks. The course is under the educational supervision of Dr. J. H. Shrader, and is conducted in coöperation with the Department of Health of the City of New York. Its purpose is to offer training in methods of food technology and sanitation as a means of increasing food production and preventing spoilage, contamination, and food poisoning. Persons who satisfactorily complete the course will be issued a Qualifying Certificate in Food Sanitation by the City Department of Health.

"FOR THIS WE FIGHT"

The Commission to Study the Organization of Peace and the Twentieth Century Fund announce a series of broadcasts entitled "For This We Fight" beginning Saturday, June 5, 7:00 to 7:30 P.M. and continuing for a period of 26 weeks. Secretary of State Cordell Hull will be the first speaker. American statesmen, businessmen, labor lead-

ers, educators, scientists, and outstanding representatives in other fields will discuss crucial postwar problems over the National Broadcast Company network during the series. International aspects of the postwar world and the national postwar issues are the main themes. Business, labor, health, economic security, education, housing, public works and related questions will all be included in the discussion of postwar problems.

1943 AMENDMENTS TO THE PUBLIC HEALTH LAWS IN GEORGIA

Among the new statutes pertaining to public health in Georgia there are new laws and regulations governing shellfish sanitation, on simplified forms of birth certificates, on birth certificates for adopted children, the filing of delayed birth certificates, the provision of enlarged county boards of health, to require the examination of blood specimens from each pregnant woman, and to prevent the use of various premises for purposes of prostitution.

The Georgia State Board of Health recently has declared a quarantine on venereal diseases in Georgia and has promulgated rules for its enforcement. The official resolution declares that an epidemic of venereal diseases "of such proportions and widespread nature that it is a menace to the public health and safety" now exists in Georgia. The quarantine is imposed on persons with syphilis, gonorrhea, and chancroid, and on persons directly exposed to these diseases. Provisions are made for the establishment of isolation or detention hospitals for the detention and treatment of these persons.

RESOLUTION ON EMPLOYMENT OF WOMEN IN WARTIME

Frances Perkins, Secretary of Labor, Washington, recently called a Conference on the Employment of Women in Wartime which adopted resolutions

relative to standards and hours of employment. The conference endorsed state laws and regulations embracing the following basic principles, except where modification may be necessary during the war period to insure maximum production.

The conference urged that peacetime standards of hours and conditions of work in civilian industry be not relaxed in order to provide conveniences, goods, and services for war workers and civilians which in peacetime may be desirable but in time of war are not truly necessary to the national well-being. If relaxation of state labor laws should be necessary, it was urged that it should be granted only in those areas in which critical labor shortages exist and that it be permitted only for the production of goods and services necessary to provide for the basic minimum subsistence needs of war workers and the civilian population.

NEW STANDARDS

The American Standards Association announces that it has approved two new standards "Allowable Concentration of Chromic Acid and Chromates" and "Allowable Concentration of Mercury." These have been developed by the Subcommittee on Allowable Concentrations of Toxic Dusts and Gases—Z.37. The representative of the American Public Health Association on this Subcommittee is J. J. Bloomfield of the National Institute of Health. Copies of the standards may be obtained from the American Standards Association, 29 West 39 Street, New York, N. Y.

LIBRARIES AND THE WAR

"Information for Victory" is the theme of the short but important annual meeting of the Special Libraries Association which is to be held June 22-24 at the Hotel Pennsylvania, New York, N. Y. The slogan of the association has been "Putting Knowledge To Work."

One important field of knowledge is public health. In the association, libraries dealing with this subject are found in the Biological Sciences Group. This group is holding special meetings at the convention and also joining other groups which cover social science, technology, finance, insurance, etc.

Marion Kappes, Librarian of The Children's Memorial Hospital, Chicago, is Chairman of the Biological Sciences Group.

PERSONALS

Central States

GAYLORD W. ANDERSON, M.D., DR. P.H.,* MAJOR M.C., U.S.A., has been appointed head of the Division of Medical Intelligence in the office of the Surgeon General, U. S. Army. This division compiles health and sanitation information from the areas to which United States troops may be sent. Dr. Anderson is head of the Division of Preventive Medicine and Public Health at the University of Minnesota Medical School, Minneapolis.

WILLARD H. DOW, of Midland, Mich., President of the Dow Chemical Company, has been awarded the Charles Frederick Chandler Medal by Columbia University for noted achievements in the field of chemistry. The medal was established in 1910 in honor of Professor Chandler, who was a Founder of the American Public Health Association.

MARSHALL S. MEYER, M.D.,† of Ashland, Wis., former Director of Sanitary District Number 9 in that city, has been named Director of District No. 6. He succeeds ALLAN A. FILEK, M.D.,† now Director of the Division of Local Health Service and Tuberculosis Control of the Wisconsin State Board of Health, Madison.

Eastern States

MURIEL F. BLISS, C.P.H.,* has joined the staff of the Connecticut State

Department of Health as Assistant in Health Education.

HOWARD FOX, M.D., has been appointed consultant in tropical medicine to the Secretary of War, in Washington, D. C.

THOMAS A. GONZALES, M.D., Chief Medical Examiner of the City of New York, has been made an honorary member of the Asociacion Medica Argentina.

Southern States

NORMAN H. BAKER, D.D.S., of Charleston, W. Va., has been reappointed as the dental member of the Public Health Council of West Virginia, for the term ending June 30, 1945.

ROBERT H. FISHBACH, Passed Assistant Surgeon, U. S. Public Health Service Reserve, formerly of Hawaii, has been appointed Director of the Lewis-Pacific Counties Public Health Department.

WILLIAM G. HANCOCK, M.D., of Rison, Ark., has been named Health Officer of Cleveland County.

R. W. HART,† P. A. Sanitary Engineer (R), has been transferred from the U. S. Public Health Service, District Office No. 4, New Orleans, La., to U. S. Public Health Service District Office No. 7, Kansas City, Mo., effective May 1, 1943.

GEORGE G. HOWARD, Passed Assistant Surgeon, U. S. Public Health Service Reserve, has been placed in charge of the Parker and Palo Pinto [Texas] County Health Unit.

THEODORE B. PARKER, Chief Engineer of the Tennessee Valley Authority, according to *Science*, has been appointed head of the Department of Civil and Sanitary Engineering in the Massachusetts Institute of Technology, Cambridge, Mass. He will succeed Professor Charles B. Breed, who asked to be relieved of administrative

duties to devote full time to the professorship of civil engineering.

BRIGADIER GENERAL JAMES STEVENS SIMMONS,† A.U.S., Director of the Preventive Medicine Division, Office of the Surgeon General, U. S. Army, Washington, D. C., delivered the John Wyckoff lectures at New York University on April 15 and 16, 1943. The title of the first lecture was: "The Preventive Medicine Program of the United States Army"; the title of the second lecture was: "The Present State of the Army's Health."

L. F. THOMEN, DR.P.H.,† having finished his Doctorate in Public Health at the Johns Hopkins University School of Hygiene and Public Health, Baltimore, Md., is returning to his home in Santo Domingo, as of May 1. He will occupy his positions as Director of the Laboratories of the School of Medicine of the Universidad de Santo Domingo, and Director of the Division of Malaria Control of the Ministry of Health of the Dominican Republic. He may be addressed at: Arzobispo Nouel.

WILLIAM H. TOLAND, M.D., of Nashville, Ark., has been appointed Health Officer for Howard County.

NOBLE A. UPCHURCH, M.D., who has been Health Officer of Jacksonville, Fla., since 1925, resigned January 1 on account of ill health. He has been succeeded by WIELAND W. ROGERS, M.D., who has been connected with the Department for about 14 years.

Western States

ELIZABETH GUNN MCCAIN, M.D., of Omak, Wash., has been appointed Health Officer of Okanogan County, to continue the unexpired term of GLENN E. STEVENS, M.D., of Okanogan, who has entered military service.

FRANK M. STEAD, Ph.D.,† formerly of the Los Angeles City Department of

* Fellow A.P.H.A.

† Member A.P.H.A.

Health, has been appointed Assistant Professor of Preventive Medicine at the University of Texas Medical Branch, Galveston.

HUBERT O. SWARTOUT, M.D., DR.P.H.,† Director of the Bureau of Preventable Disease in the Los Angeles County Health Department, has been appointed Acting Health Officer of the County.

Hawaii

MAJOR CHARLES L. WILBAR, JR., M.C., U. S. Army, has been appointed Health Officer of Maui County with headquarters in Wailuku.

WILLIAM L. ZINK, Assistant Surgeon, U. S. Public Health Service Reserve, has been assigned to operate the new mobile x-ray unit of the Territory of Hawaii Health Board.

CONFERENCES AND DATES

American Home Economics Association—Wartime Institute with 225 delegates representing all state associations. University of Maryland, Baltimore, Md. June 18-21.

American Public Health Association—Wartime Public Health Conference and 72nd Annual Business Meeting. New York, N. Y. October 12-14.

American Society of Clinical Pathologists. Chicago, Ill. June 4-6.

American Society of Heating and Ventilating Engineers—Semi-annual meeting. William Penn Hotel, Pittsburgh, Pa. June 6-8.

American Water Works Association—Conference on War Winning Water Works Operations. Carter and Statler Hotels (co-headquarters), Cleveland, Ohio. June 15-18.

Rocky Mountain Section—Denver, Colo. September 16-17.

Western Pennsylvania Section—Roosevelt Hotel, Pittsburgh, Pa. September 22-23.

Southwest Section—Hotel Biltmore, Oklahoma City, Okla. October 11-13.

California Section—Biltmore Hotel, Los

Angeles, Calif. October 27-29.

Civil Service Assembly—

Western Regional Conference. Yosemite National Park, Mariposa, Calif. June 5-6.

Idaho Public Health Association. Boise, Idaho. June 3-4.

Institute of Food Technologists—Wartime Conference on Food. St. Louis, Mo., June 2-4.


New York State Association of Public Health Laboratories—Annual Meeting. The State Laboratory, Albany, N. Y. June 25.

Pennsylvania Sewage Works Association—in collaboration with Pennsylvania Water Works Operators' Association. Wartime Conference. Penn Harris Hotel, Harrisburg, Pa. June 8-9.

Special Libraries Association. New York, N. Y. June 22-24.


State Nursing Councils for War Service—Meeting of Secretaries. Medinah Club, Chicago, Ill. June 17-18.

Washington Public Health Association. Seattle, Wash. May 31-June 1.



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Brucellosis: Consideration of Its Epidemiology, Diagnosis and Control*

CARL F. JORDAN, M.D., M.P.H., F.A.P.H.A., IRVING H. BORTS, M.D., F.A.P.H.A., DONALD M. HARRIS, M.D., M.P.H., F.A.P.H.A., AND JAMES R. JENNINGS, C.E., F.A.P.H.A.

Epidemiologist, Iowa State Department of Health, Des Moines; Associate Director, State Hygienic Laboratory, Iowa City; Medical Director, District Health Service No. 3, Spencer; and Milk Sanitarian, Iowa State Department of Health, Des Moines, Iowa

DURING 1930-1941, there were reported in the 48 states of this country 29,594 cases of brucellosis, an average annual rate of 1.87 per 100,000 population.† Officially notified cases in Iowa totaled 1,887 for the same 12 year period, the average annual rate being 6.25 per 100,000.

Direct contact with infected animals and use of raw milk products from infected dairy cows provide the chief means of transmission to man of brucellosis or undulant fever. This statement applies to Iowa, probably also to many if not all of the cattle and hog raising states. As pointed out by Hardy and associates,¹ direct contact with hogs must be considered a major factor to account for the relatively high inci-

dence of brucellosis in the midwestern states of this country. Cases resulting from direct contact, whether with infected hogs or cows, are usually of sporadic nature; such cases in the aggregate, apparently exceed in number those traceable to contaminated dairy products.

Milk-borne brucellosis likewise, is nearly always of sporadic occurrence when *Brucella abortus*, the bovine type of organism, is the etiologic agent. On the other hand, when the porcine strain, *Brucella suis*, gains access to the udder of a dairy cow to contaminate a raw milk supply, multiple cases of the disease may be fully expected. This may be due to the fact that *Brucella suis* is more highly pathogenic than *Brucella abortus* and that the former multiplies more rapidly in a milk medium under ordinary atmospheric conditions than does the bovine strain of brucella.

Brucellosis lends itself favorably to epidemiologic study. The organism has

* Presented at a Joint Session of the Laboratory, Engineering, and Epidemiology Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

† A table containing annual reports from the 48 states covering the 12 year period 1930-1941 may be had on request of the Iowa State Department of Health, Des Moines, Ia.

distinct morphologic and cultural characteristics, and can readily be isolated from blood, although such isolation may require several weeks to a month or longer. Agglutination, intradermal and other tests are available to throw light on the nature of infection and immunity. The disease in the animal reservoir and in the experimental animal also affords opportunity for determination of virulence, manner of spread and source of infection.

It is desired in this report to limit consideration to milk-borne brucellosis; information as presented is based on an investigation of two cases caused by *Brucella abortus* in Madrid (Boone County), Iowa, and on the study of an epidemic in Marcus, Iowa, in which *Brucella suis* was the inciting agent.

MADRID INVESTIGATION AND SURVEY (BRUCELLA ABORTUS)

On July 2, 1942, Mr. A. L., 68, a resident of Madrid (Pop. 2,074), Boone County, Iowa, began to complain of tired feeling, pain in back of neck, fever (102°), chills and sweats. Three weeks later, the patient's serum was found to agglutinate brucella antigen in a dilution of 1:1,280. The patient gave no history of direct contact with farm animals, but during the months antecedating illness, had used two glasses daily of raw milk from a local, the C. S., dairy. Through coöperative arrangement between the State Department of Health, the Bureau of Animal Industry, and the State Department of Agriculture, local veterinarians were authorized to obtain blood specimens from dairy herds which supplied milk in the community. Of 13 cows in the C. S. dairy, 9 proved to be reactors to the agglutination test for Bang's disease. The dairyman concerned, a thoroughly coöperative person, sold no milk to patrons after July 31. Other herds were not tested at the same time, due mainly to misunderstanding

on the part of producers with respect to accuracy of the agglutination test.

Although a blood culture from the patient failed to yield *Brucella abortus*, it is highly probable that infection was due to brucella of bovine type. This organism was later isolated from guinea pigs, following subcutaneous injection of cream from reactor cows.

While sporadic cases had developed from time to time in rural areas of the county, the case of brucellosis in Madrid was the first to come under observation of local physicians in a period of more than a decade. In addition to the patient, it was assumed that scores of children and adults in many homes had been exposed to the contaminated milk supply. With the interest and aid of local physicians, school superintendent, and parents, arrangements were made for blood specimens to be obtained for the agglutination test and for skin tests to be administered, using brucellergen. Such a survey was conducted in the school building on August 11, 1942, and again, for the most part on a different group, on September 29. Record was kept of the age and sex of volunteers, of residence in town or country, and of the source of milk supply.*

RESULTS OF AGGLUTINATION TESTS

The agglutination tests were carried out at the State Hygienic Laboratory, beginning with a titer of 1-5. The results as summarized for a group of 147 persons, are presented in Table 1. Males and females being considered equally susceptible to brucellosis of milk-borne character, the whole group was classified according to three age groups, 1-9, 10-19, 20 and over. Further classification was made under two headings, including on the one hand consumers of the "contaminated milk supply" and, on the other hand, those

* The authors desire to acknowledge the valued assistance in the investigation at Madrid of Glen M. Grout, Sup't of Schools, R. A. Gamble, M.D., M. M. Shaw, M.D., and J. O. Cook, M.D.

who had used "other milk supplies." "Other milk supplies" refers to five producers of raw milk and to "own cows" of those from the surrounding rural area.

It will be noted that among 63 users of the contaminated milk supply, 18, or 28.6 per cent, showed agglutination in titers ranging from 1:5 to 1:40, the titer of but one person being 1:40. Of 84 individuals of all ages, representing consumers of "other milk supplies," 17, or 20.2 per cent, showed positive agglutination, 16 in titers of 1:5-1:20 and one in the 1:40 dilution.

These results, based as they are on a comparatively small number of people, some of whom used milk and cream only sparingly, are hardly remarkable. A similar agglutination survey, in a sanatorium or institution with an abundant per capita use of raw milk from infected dairy cows, would probably be accompanied by more significant evidence of latent infection.²

RESULTS OF SKIN TESTS

Intradermal tests were administered with brucella nucleoprotein, known as brucellergen and made according to the method of I. Forest Huddleson, D.V.M., Research Professor in Bacteriology, Michigan State College, East Lansing, Mich. Two types of antigen were supplied for this survey through the courtesy of Dr. Huddleson, prepared separately from *Brucella abortus* (dilution 1:12,000) and *Brucella suis* (1:4,000). Each person received two intradermal tests (0.1 ml.) on the inner aspect of the forearm, brucellergen abortus above and brucellergen suis below. Each preparation was further diluted to 1:60,000 and 1:20,000 respectively to avoid the possibility of a severe reaction in those who might be markedly allergic.

Skin reactions were observed and measured after an interval of 48 hours, an area 2 x 2 cm. in diameter, with

redness, induration, and tenderness being recorded as positive. The results are set forth in Table 2. As in Table 1, those tested were divided into three age groups, 1-9, 10-19, 20 and above, and according to use of "contaminated" and "other milk supplies." Skin tests were performed on 170 volunteers. Among 71 who had used the contaminated milk supply, 10, or 14.1 per cent, had positive reactions; of 99 consumers of other milk supplies, 12 or 12.1 per cent, showed allergic response.

It is of interest to note that among 27 children of the age group 1-9, 13 of whom used the contaminated milk, all showed negative skin reactions.

There was no notable difference in size, redness, or induration between the reaction produced by brucellergen abortus and that resulting from brucellergen suis.

OCCURRENCE OF A SECOND CLINICAL CASE

Among those who participated in the agglutination and skin test survey on August 11 were Mr. and Mrs. D, aged 40+, residents of the city and exposed to the contaminated milk supply. Mr. D's agglutination test was negative, his skin tests strongly positive. Agglutination and skin tests were both negative in the case of Mrs. D, but she began to complain of fever and indisposition about September 1. On September 10, a second blood specimen showed agglutination of brucella in a dilution of 1:320, and the skin test had become positive. It seems probable that this woman carried a latent infection on August 11, in spite of negative skin and agglutination tests. Among 30 other individuals whose serum when taken August 11 showed no agglutinins or titers not higher than 1:5 or 1:10, 21, or 70 per cent, were entirely negative when the agglutination test was repeated on September 29.

TABLE 1
Agglutination Tests for Brucellosis in Relation to (1) a Raw Milk Supply Contaminated with
Brucella Abortus and to (2) Other Milk Supplies in Madrid, Boone County, Iowa, 1942

| Age Group | Contaminated Milk Supply Agglutination Reaction | | | | Other Milk Supplies Agglutination Reaction | | | | All Milk Supplies Agglutination Reaction | | | |
|-------------|--|-------|---------------|------|---|-------|---------------|------|---|-------|---------------|--------------|
| | Negative | | Positive | | Negative | | Positive | | Negative | | Positive | |
| | No. Tested | % | No. Tested | % | No. Tested | % | No. Tested | % | No. Tested | % | No. Tested | % |
| | | | | | | | | | | | 1:5 1:20 | 1:40 1:80 |
| 1-9 | 1 | 100.0 | 1 | 0.0 | 4 | 100.0 | 0 | 0.0 | 5 | 100.0 | 0 | 0.0 |
| 10-19 | 14 | 71.4 | 10 | 28.6 | 46 | 78.3 | 36 | 78.3 | 46 | 76.7 | 0 | 0.0 |
| 20 and over | 48 | 70.8 | 34 | 29.2 | 34 | 79.4 | 27 | 79.4 | 60 | 74.4 | 13 | 23.3 |
| Totals | 63 | 71.4 | 45 | 28.6 | 84 | 79.8 | 67 | 79.8 | 147 | 76.2 | 20 | 25.6 |

TABLE 2
Skin Tests with Brucellergen in Relation to (1) a Raw Milk Supply Contaminated with *Brucella*
Abortus and to (2) Other Milk Supplies in Madrid, Boone County, Iowa, 1942

| Age Group | Contaminated Milk Supply Skin Test Reading | | | | Other Milk Supplies Skin Test Reading | | | | All Milk Supplies Skin Test Reading | | | |
|-------------|---|-------|---------------|------|--|-------|---------------|------|--|-------|---------------|--------------|
| | Negative | | Positive | | Negative | | Positive | | Negative | | Positive | |
| | No. Tested | % | No. Tested | % | No. Tested | % | No. Tested | % | No. Tested | % | No. Tested | % |
| | | | | | | | | | | | 1:5 1:20 | 1:40 1:80 |
| 1-9 | 13 | 100.0 | 13 | 0.0 | 14 | 100.0 | 0 | 0.0 | 27 | 100.0 | 0 | 0.0 |
| 10-19 | 14 | 100.0 | 14 | 0.0 | 50 | 87.7 | 7 | 12.3 | 64 | 90.1 | 7 | 9.9 |
| 20 and over | 44 | 77.3 | 34 | 22.7 | 28 | 82.1 | 5 | 17.9 | 57 | 79.2 | 15 | 20.8 |
| Totals | 71 | 85.9 | 61 | 14.1 | 99 | 87.9 | 12 | 12.1 | 148 | 87.1 | 22 | 12.9 |

MARCUS INVESTIGATION AND SURVEY (BRUCELLA SUIIS)

On September 10, 1941, investigation was made in Marcus (population 1,206), Cherokee County, Iowa, of 13 cases of brucellosis. These cases, verified by positive agglutination findings at the State Hygienic Laboratory, were reported by the local health officer and attending physician, to the District Health Service and to the State Department of Health. All of the patients gave the history of having been supplied with milk from the W. H. dairy, distributor of raw milk. Delivery of milk from this dairy was stopped September 10, 1941. In spite of early removal of the contaminated milk supply, additional cases came to attention through the remaining months of 1941. In the entire outbreak, 77 persons were found to have active or latent infection as confirmed by positive agglutination tests. Of a series of 29 blood cultures, 13 yielded brucella, all strains being identified as *Brucella suis*.

Agglutination tests for Bang's disease, performed on serum of cows in the W. H. dairy, showed three positive (and one suspicious) reactors. *Brucella suis* was isolated from the cream of two reactors. Hogs on the dairy farm were also found to be infected.⁴

The Marcus milk-borne epidemic caused by *Brucella suis* was the second of its kind to be investigated in Iowa; the first outbreak occurred in 1933 and was reported by Beattie and Rice.⁵

In order to obtain additional information as to the extent of infection in the Marcus community, blood specimens for agglutination were secured and skin tests performed on students and adults in the public and parochial schools.*

* Acknowledgment is made of the valued assistance in the investigation at Marcus of Father E. M. McEvoy, H. Wood, Sup't of Public Schools, and M. F. Joynt, M.D.

RESULTS OF AGGLUTINATION TESTS

Findings of the agglutination survey are presented in Table 3. Here also, those contributing specimens have been classified into the age groups 1-9, 10-19, 20 and above, and according to whether the "contaminated milk supply" or "other milk supplies" were used during the months preceding the epidemic. The group totalled 204; among 33 who had been exposed to contaminated milk, 12, or 36.3 per cent, showed positive agglutination for brucellosis, all in diagnostic dilutions varying from 1:80 to 1:2,560. Five children were under 10 years, the remaining 7 between 10 and 19 years of age. There was no instance of agglutination in diagnostic titer among 171 consumers of other milk supplies.

RESULTS OF SKIN TESTS

Material for performing intradermal tests with brucellergen, was supplied through the courtesy of Dr. Huddleson of Michigan State College. Two separate antigens were used without further dilution, one prepared from *Brucella abortus* (1:12,000), the other from *Brucella suis* (1:4,000). One girl of teen age whose agglutination test was negative, but who was apparently very allergic, showed a severe reaction, with subsequent necrosis of the skin and subcutaneous tissues. In a few instances, individuals showed a more marked reaction with brucellergen suis than with brucellergen abortus.

A summary of results of the series of intradermal tests is contained in Table 4. A striking difference will be noted in the percentage of positive skin tests among those using contaminated milk as compared with those whose milk came from other sources. Among 57 persons of all ages who used the contaminated milk supply, 42, 73.7 per cent, showed positive skin reactions, whereas 17, or 10.8 per cent, of 158

consumers of other milk showed a positive or an allergic response.

FOLLOW-UP OF AGGLUTINATION REACTIONS

On October 18, 1942, another blood specimen for agglutination was obtained by one of us (D.M.H.) with the coöperation of M. F. Joynt, M.D., of Marcus. Of 27 patients, whose serum showed agglutination of brucella antigen in titers from 1:160 to 1:1,280 during the late months of 1941, 7 showed negative agglutination and 16 had titers down to 1:10, 1:20, or 1:40 in October, 1942.

DIAGNOSIS, CONTROL, AND PREVENTION

The isolation of brucella from the blood stream stands first among laboratory aids which confirm the physician's clinical diagnosis of brucellosis. Finding of the organism makes possible its species identification, which in turn helps to establish the source of infection in hogs, cows, or other animals.

The presence of agglutination in diagnostic dilution is second only to the blood culture as an aid in clinical diagnosis. Both rapid and slow methods of agglutination are dependable. Should a first specimen show negative or weakly positive agglutination, taking of subsequent specimens will frequently result in strongly positive agglutination reports.

A positive intradermal test with brucella antigen signifies exposure to brucella infection in the recent or remote past. Simpson⁶ advises against over-emphasizing the diagnostic significance

of this test, stating that the intradermal test when positive "does not mean that the symptoms from which the patient is suffering at the time are necessarily due to brucellosis."

Findings of the opsonocytophagic test are probably most dependable when observed soon after onset of symptoms. Results need to be interpreted with caution.

Economically and from a health standpoint, brucellosis is one of the most important diseases transmissible from animals to man. Measures for eradication of Bang's disease need to be pursued vigorously in coöperation with veterinarians, the Federal Bureau of Animal Industry, and state departments of agriculture.

Use of none but carefully pasteurized dairy products and enforcement by cities and communities of the *Standard Milk Ordinance* as recommended by the U. S. Public Health Service, afford the best assurance against the possibility of milk-borne disease.

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Some Epidemiological Aspects of Tuberculosis Determined by Analysis of Sanatorium Records*

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IN September, 1938, the Massachusetts State Department of Health, with the coöperation of the Middlesex County Sanatorium and the financial support of the Commonwealth Fund, called on the writer to make a statistical analysis of the clinic records of the county sanatorium. The purpose of this study was to throw more light upon the epidemiology of tuberculosis in order that methods of disease control could be better evaluated.

SOURCE OF CLINICAL MATERIAL

Middlesex County is the third largest county in Massachusetts, comprising an area of 844 square miles. The tuberculosis hospital district excludes the cities of Cambridge and Lowell. There are 43 towns and 9 cities in the hospital district, with a population of 759,122 (1940 census), of which approximately 14 per cent is foreign born. The area served by the hospital is chiefly residential, many of the white-collar workers commuting to Boston. The chief industries include textile mills, shoe manufacture, mechanical assembly plants, tanneries, oil refineries, and a large granite quarry in one small town. At the time of this

study (1938-1940) the tuberculosis mortality rate was approximately 28 per 100,000.

The study is based on a total of 10,929 patients examined in the sanatorium out-patient department during the years 1931-1938 inclusive. There were 1,220 active cases of tuberculosis diagnosed during the period, representing a gross morbidity of 11.1 per cent. These patients were referred to the sanatorium by (1) private physicians, (2) sanatorium social service because of known familial contact, (3) local boards of health because of contact with a reported case, (4) school physicians because of positive tuberculin reaction and suspicious physical findings, (5) welfare health associations because of so-called "indices" of tuberculosis, i.e., underweight, poor housing conditions, etc. In keeping with the best practices of an out-patient tuberculosis clinic, extensive records were maintained and every effort was made to examine and follow up all contacts. Each medical record includes a clinical history of the patient and his family, summary of physical examination, results of tuberculin test, x-ray interpretation, and laboratory findings.

METHOD OF STUDY

The value of a clinic group as a concentrated source of medical information

* Presented before the Epidemiology Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 28, 1942.

is acknowledged by the medical profession at large. It is admitted too that conclusions drawn from a study of a clinic population are limited because of certain inherent fallacies. That an out-patient department, functioning as an aid to diagnosis, is associated with a select group of patients is readily understood when one considers the various economic, sociological, and medical factors involved. In the present study an attempt was made to control the many variables that are known to influence the morbidity in a clinic population. For purposes of comparison strict adherence to definition was imperative.

Data on clinic records were coded, transcribed to punch cards, tabulated, and analyzed for statistical significance. Patients diagnosed "negative for tuberculosis" include persons whose chest roentgenograms were either negative or demonstrated evidence of upper lobe fibrosis and calcification, healed basal or apical pleuritis, calcified hilar glands, or the presence of a solitary parenchymal tubercle. Dependent on the subject of study, the many classifications of patients were studied singularly or grouped in broader categories. The method of grouping is defined in each of the parts of the present study.

I. STUDY OF TOTAL OUT-PATIENT POPULATION

Of the total patients examined, 5,334 gave a history of intimate contact with a case sharing the same household environment at the time of examination or at some previous time. Tuberculosis morbidity in contacts was determined in relation to the family aggregate by classification according to sex and familial relationship to source case. More comparable rates were obtained by the exclusion of patients under 15 since this age group did not include consorts. The age-adjusted morbidity rates are shown in Chart I.

The rates were obtained by the "direct method," employing the formula $\Sigma P_1 \dots k \cdot r_1 \dots k$ in which P represents the age-specific population of the total contact population examined and r the age-specific rates by sex and relationship to source case. Of note is the comparatively low rate in consorts, and the higher morbidity in females in all classifications other than patients exposed to "father."

From a review of the individual case records it was apparent that 805 contacts reporting a tuberculosis death in the family household 1 to 10 years prior to examination were examined for reasons other than contact; in the 4,529 remaining contacts, however, examination was indicated chiefly because of contact. It was believed that analysis of the latter group would yield more comparable rates since the many factors, illness particularly, associated with a clinic population were thereby minimized.

Among the 4,529 contacts there were discovered 323 cases of tuberculosis, 223 among the 2,521 females and 100 among the 2,008 males. This is a significantly higher morbidity in females.

The age-specific tuberculosis morbidity is shown in Table. 1. For comparison similar data are given for the 4,955

CHART I

COMPARATIVE (AGE-ADJUSTED) MORBIDITY IN CONTACTS ACCORDING TO SEX AND FAMILIAL RELATIONSHIP TO SOURCE CASE (AGES 15 & ABOVE)

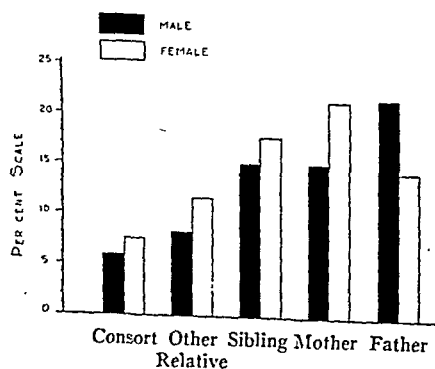


CHART IIA

MORBIDITY IN CONTACTS OF LIVING HOUSEHOLD CASES

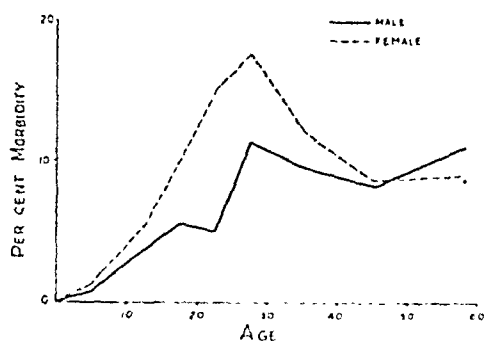


CHART IIB

MORBIDITY IN PATIENTS WITH NO HISTORY OF CONTACT

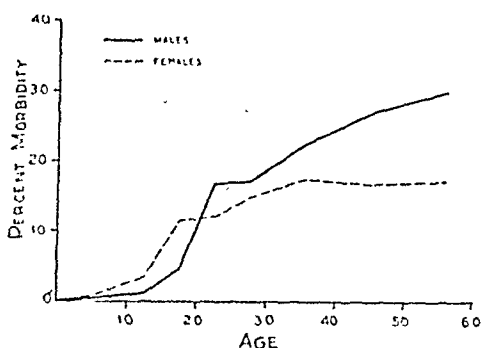


TABLE 1

Morbidity by Contact, Sex and Age

| Age | (A) Contacts of Living Household Cases | | | | | | (B) Negative History of Contact | | | | | |
|-------|--|-----|------|----------|-----|------|---------------------------------|-----|------|----------|-----|------|
| | Males | | | Females | | | Males | | | Females | | |
| | No. Ex'd | TB | %TB | No. Ex'd | TB | %TB | No. Ex'd | TB | %TB | No. Ex'd | TB | %TB |
| 0-9 | 624 | 5 | 0.80 | 578 | 7 | 1.2 | 353 | 1 | 0.26 | 335 | 2 | 0.60 |
| 10-14 | 355 | 13 | 3.7 | 380 | 21 | 5.5 | 279 | 3 | 1.1 | 296 | 10 | 3.4 |
| 15-19 | 275 | 15 | 5.5 | 313 | 31 | 9.9 | 264 | 13 | 4.9 | 280 | 33 | 11.8 |
| 20-24 | 180 | 9 | 5.0 | 274 | 42 | 15.0 | 241 | 41 | 17.0 | 399 | 49 | 12.3 |
| 25-29 | 166 | 19 | 11.4 | 268 | 47 | 17.5 | 249 | 43 | 17.3 | 387 | 58 | 15.0 |
| 30-39 | 199 | 19 | 9.6 | 354 | 43 | 12.1 | 387 | 88 | 22.7 | 507 | 90 | 17.8 |
| 40-49 | 119 | 10 | 8.4 | 202 | 18 | 8.9 | 303 | 82 | 27.1 | 247 | 42 | 17.0 |
| 50+ | 90 | 10 | 11.1 | 152 | 14 | 9.1 | 249 | 75 | 30.1 | 149 | 26 | 17.4 |
| Total | 2,008 | 100 | 5.0 | 2,521 | 223 | 8.8 | 2,355 | 346 | 14.8 | 2,600 | 310 | 11.9 |

TABLE 2

A. Morbidity by Sex and Relationship to Source Case

| Source Case | Males | | | Females | | |
|-------------|------------|--------|-----|------------|--------|------|
| | Total Ex'd | No. TB | %TB | Total Ex'd | No. TB | %TB |
| Father | 471 | 27 | 5.7 | 490 | 31 | 6.3 |
| Mother | 420 | 8 | 1.9 | 438 | 28 | 6.4 |
| Consort | 220 | 17 | 7.7 | 359 | 31 | 8.6 |
| Sibling | 463 | 25 | 5.4 | 650 | 87 | 13.4 |
| Other | 434 | 23 | 5.3 | 584 | 46 | 7.4 |
| Total | 2,008 | 100 | 5.0 | 2,521 | 223 | 8.8 |

B. Per cent Morbidity in Contacts of Living Household Cases According to Sex and Relationship to Source Case (Ages 15 and Over)

| Source Case | Total Examined | | Crude Rate | | Age-adjusted Rate | |
|----------------|----------------|---------|------------|---------|-------------------|---------|
| | Males | Females | Males | Females | Males | Females |
| Father | 165 | 182 | 10.3 | 12.6 | 11.2 | 10.1 |
| Mother | 91 | 125 | 5.5 | 13.6 | 6.2 | 15.9 |
| Consort | 220 | 359 | 7.7 | 8.6 | 4.8 | 6.3 |
| Sibling | 316 | 498 | 6.6 | 16.3 | 6.6 | 15.3 |
| Other relative | 237 | 399 | 9.3 | 11.3 | 7.1 | 11.3 |
| Total | 1,029 | 1,263 | 8.0 | 15.6 | | |

patients with no known exposure and who were examined for reasons other than contact. In Table 1 and Chart II-A it is noted that the morbidity in females under 50 is consistently higher than that in males of similar age. In patients with a negative history of contact (Table 1, Chart II-B), among those under 20, the morbidity is higher in females; over 20 the morbidity rate is significantly higher in males, as measured by the chi-square test for statistical significance.

The morbidity according to sex and relationship to source is summarized in Table 2. Of note is the higher morbidity in females, particularly those exposed to a "sibling" and, dependent on age, the comparatively low morbidity in consorts.

II. THE DEVELOPMENT OF TUBERCULOSIS AS OBSERVED IN THE OUT-PATIENT CLINIC

In Part I it was noted that 1,220 cases of tuberculosis were diagnosed in 10,929 patients. Of the remaining 9,709 patients 268 gave evidence of non-tuberculous pulmonary disease on x-ray, and were referred to general hospitals for therapy. There were 9,441 persons whose chest roentgenograms on initial examination were either negative or demonstrated evidence of healed spe-

cific or nonspecific pulmonary infection. This group constitutes the patients in whom the development of tuberculosis was observed. A patient who was seen to develop the disease is defined as a "breakdown."

It is obvious that a number of factors played a part in determining the frequency of reexamination and the duration of follow-up, i.e., coöperation of the patient, age, contact, tuberculin reaction, and other clinical data referable to respiratory infection. The object of this administrative procedure was to diagnose tuberculosis in its earliest stages in a clinic group which was thought highly susceptible to the disease.

Of the total negative population, 4,076 patients were observed for a period of at least 1 year. The rate of development of tuberculosis (breakdown rate) is presented in Table 3, employing a "modified life table method."¹ The duration of follow-up is expressed to the nearest year. The cumulative per cent breakdown for a period of 6-7 years of observation is $3.31 \pm .61$; 54 of the 65 breakdowns occurred within the first 2 years. This rate is based on the rate at which the patients were dropped from the clinic and is therefore adjusted for duration of follow-up. An estimate of the

TABLE 3
Per cent Breakdowns in Patients Followed for at Least One Year

| <i>Year of Follow-up</i> (1) | <i>No. at Risk</i> (2) | <i>No. of Breakdowns in Specific Year</i> (3) | <i>Per cent Breakdowns in Specific Year</i> (4) | <i>No. Dropped (Incl. Breakdowns)</i> (5) | <i>Cumulative % Breakdowns</i> (6) |
|---------------------------------|---------------------------|--|--|--|---|
| Initial exam. | 9,441 | — | — | 5,156 | — |
| 1 | 4,076 | 33 | 0.81 ± 0.14 | 1,717 | 0.81 ± 0.14 |
| 2 | 2,359 | 21 | 0.89 ± 0.19 | 902 | 1.70 ± 0.24 |
| 3 | 1,457 | 3 | 0.21 ± 0.12 | 559 | 1.91 ± 0.27 |
| 4 | 898 | 4 | 0.44 ± 0.22 | 384 | 2.35 ± 0.35 |
| 5 | 514 | 3 | 0.58 ± 0.34 | 251 | 2.93 ± 0.47 |
| 6 | 263 | 1 | 0.38 ± 0.38 | 189 | 3.31 ± 0.61 |
| 7 | 74 | — | — | — | 3.31 ± 0.61 |

TABLE 4

Breakdown Rates According to Age Based on Total Years of Observation

| Age Group | Total Years of Observation | No. of Breakdowns | Per cent Breakdowns |
|-----------|----------------------------|-------------------|---------------------|
| 0-14 | 5,364 | 17 | 0.32 ± 0.08 |
| 15-19 | 1,439 | 25 | 1.76 ± 0.56 |
| 20-24 | 788 | 8 | 1.02 ± 0.36 |
| 25+ | 2,050 | 15 | 0.73 ± 0.19 |
| Total | 9,641 | 65 | 0.68 ± 0.08 |

TABLE 5

Breakdown Rates According to Sex and Age Based on Total Years of Observation

| Age Group | Males | | | Females | | |
|-----------|----------------------|------------|-----------------|----------------------|------------|-----------------|
| | Years of Observation | Breakdowns | | Years of Observation | Breakdowns | |
| | | No. | Per cent | | No. | Per cent |
| 0-14 | 2,614 | 6 | 0.23 ± 0.09 | 2,750 | 11 | 0.41 ± 0.01 |
| 15-19 | 658 | 8 | 1.22 ± 0.43 | 781 | 17 | 2.18 ± 0.53 |
| 20-24 | 283 | 3 | 1.06 ± 0.60 | 505 | 5 | 0.98 ± 0.43 |
| 25+ | 723 | 5 | 0.69 ± 0.31 | 1,327 | 10 | 0.75 ± 0.24 |
| Total | 4,278 | 22 | 0.51 ± 0.11 | 5,363 | 43 | 0.80 ± 0.12 |

standard deviation of a cumulative rate was derived by the formula $\sigma^2 = \sigma_1^2 + \sigma_2^2 + \dots + \sigma_n^2$, i.e., the (S.D.)² of the rate equals the (S.D.)² of the year-specific rates. By the same method, statistical comparison of the cumulative morbidity by sex for a like period of observation yields a higher rate in females than in males, 4.66 ± 1.1 cf $1.71 \pm .38$ per cent.

Because of the small number of breakdowns it was thought that the determination of breakdown rates according to the total number of years of observation (person-years) rather than to the total persons followed would offer a better method for comparative purposes. In this statistical procedure it is assumed that the rate of dropping-out of clinical observation is the same for the various classifications of persons (by age, sex, and contact) studied. The 4,076 patients represent a total of 9,641 person-years of observation; the rate of breakdown for the entire group being $0.68 \pm .08$ per 100 years. The age-specific rates are shown in Table 4.

The breakdown rates according to sex are summarized in Table 5. Under

20 the rate in females is almost twice that in males ($\chi^2 = 6.14$, $p = .014$); in older ages the differences between the sexes are not statistically different. Based on total number of years of observation, however, the rate in females is significantly higher than that in males.

That the risk of breakdown varies with the degree of exposure is shown in Table 6.

TABLE 6

Breakdown Rates per 100 Person-Years by Exposure

| Exposure | Crude | Age-Adjusted |
|------------------|----------------|--------------|
| Denied | $.434 \pm .15$ | .479 |
| Extra-familial | $.570 \pm .23$ | .577 |
| Within household | $.756 \pm .11$ | .769 |

It is of interest to compare the data in Table 4 with Table 7. In Table 7 the age-specific population may be looked upon as so many years of observation, the new cases as so many breakdowns. In this sense the data may be considered comparable with Table 4. In the age groups 0-14 and 15-19 it is of note that the rates in the

TABLE 7

New Cases of Pulmonary Tuberculosis Reported in Massachusetts in 1937

| Age Group | Total Population | New Cases | $\frac{\text{Cases}}{\text{Population}} \times 100$ |
|-----------|------------------|-----------|---|
| 0-14 | 1,049,461 | 180 | 0.17 ± 0.01 |
| 15-19 | 375,075 | 250 | 0.67 ± 0.04 |
| 20-24 | 249,072 | 406 | 1.16 ± 0.06 |
| 25+ | 2,528,323 | 2,392 | 0.95 ± 0.02 |
| Unknown | | 303 | |
| Total | 4,201,931 | 3,531 | 0.82 ± 0.01 |

clinic population are approximately from two to two and one-half times that of the general population. These differences are statistically significant. A review of the age distribution of the two populations reveals striking differences. For this reason the morbidity rate of the clinic population was adjusted to the age distribution of the state. By so doing the rate ($.743 \pm .09$) obtained in the sanatorium group tends to approximate the rate ($.821 \pm .01$) in the general population.

III. STUDY OF COMPLETE FAMILIES

The contact data in Part I were based on family history from individual records and not related to results of examination of the entire family household. To test the validity of con-

clusions that could be drawn from Part I a more objective approach to the epidemiology of tuberculosis was made by a study of families in which all members were examined. By this method it was believed that such factors as cause for or failure of examination would be subject to better control.

This study comprises 479 families in which all living members of the household were examined either at the county sanatorium or another institution within the state. In each family there was at least 1 case of tuberculosis, and family history revealed no known death from the disease at the time of examination. These families represented 1,884 living household members. The age-specific tuberculosis morbidity is noted in Table 8.

TABLE 8

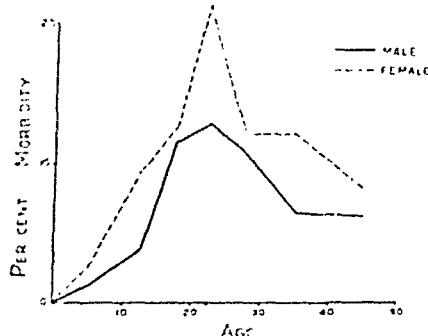
Age-Specific Morbidity

| Age | Total Population | Primary Cases on Initial Exam. | Primary Cases on Subsequent Exam. | No. Contacts Examined | Contacts with TB on Initial Exam. | Per cent Contacts with TB on Initial Exam. | No. Contacts Neg. on Initial Exam. | No. Breakdowns | Per cent Breakdowns in Initially Negative Contacts | Total Contacts with TB | Per cent Morbidity in Total Contacts |
|-------|------------------|--------------------------------|-----------------------------------|-----------------------|-----------------------------------|--|------------------------------------|----------------|--|------------------------|--------------------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| 0-9 | 475 | 3 | .. | 472 | 7 | 1.5 | 465 | 2 | 0.4 | 9 | 1.9 |
| 10-14 | 226 | 3 | .. | 218 | 10 | 4.6 | 208 | 5 | 2.4 | 15 | 6.9 |
| 15-19 | 160 | 18 | 2 | 140 | 9 | 6.4 | 131 | 8 | 6.1 | 17 | 12.1 |
| 20-24 | 141 | 44 | 1 | 96 | 16 | 16.7 | 80 | 1 | 1.2 | 17 | 17.7 |
| 25-29 | 182 | 78 | .. | 104 | 10 | 9.6 | 94 | 3 | 3.2 | 13 | 12.5 |
| 30-39 | 320 | 135 | 1 | 184 | 15 | 8.2 | 169 | 2 | 1.2 | 17 | 9.2 |
| 40-49 | 238 | 108 | .. | 130 | 7 | 5.4 | 123 | 2 | 1.6 | 9 | 6.9 |
| 50-59 | 78 | 34 | .. | 44 | .. | ... | 44 | .. | ... | .. | ... |
| 60-69 | 26 | 13 | .. | 13 | .. | ... | 13 | .. | ... | .. | ... |
| 70+ | 6 | 2 | .. | 4 | .. | ... | 4 | .. | ... | .. | ... |
| N.S. | 32 | 32 | .. | .. | .. | ... | .. | .. | ... | .. | ... |
| Total | 1,884 | 475 | 4 | 1,405 | 74 | 5.3 | 1,331 | 23 | 1.7 | 97 | 6.9 |

The primary case is the member of the household with the most advanced stage of pulmonary tuberculosis; in families with more than one member with the same stage of disease, the oldest was designated as the primary case. The exact ages of 32 patients with advanced disease were unknown; approximate ages, however, were estimated by a study of their relationship to other members of the household. Columns (3) and (8) of the same table represent the number of cases (break-downs, v.s.) diagnosed by serial x-ray examination. In 4 families (col. 3) the entire household was examined because a member was seen to develop the disease on follow-up. In these cases the reason for repeated examination was clinical, i.e., underweight, tuberculin sensitivity, and chronic respiratory ailments.

A single examination of the 1,405 contacts revealed a tuberculosis morbidity of 5.3 per cent, the rate in the 20-24 year age group being three times that of the group as a whole. In column (9) it is noted that 1.7 per cent of 1,331 contacts essentially negative on

CHART III
MORBIDITY IN CONTACTS OF COMPLETELY EXAMINED HOUSEHOLDS



initial examination were observed to develop the disease by serial roentgenography. It is significant to note that contacts 15-19 years of age revealed a morbidity on subsequent examination comparable to that on initial examination. It is to be emphasized that, in comparing the breakdown rates according to age, it is assumed that the period of observation is comparable in all age groups. The total morbidity in contacts as determined by both initial and subsequent examinations is 6.9 per cent.

Morbidity by sex is shown in Table 9 and Chart III. For the total house-

TABLE 9
Morbidity by Sex, Age and Contact

| Age | Males | | | | | | Females | | | | | |
|------------|------------------|-------------------|------------------------------|-----------------------|----------------------|-----------------------------------|------------------|-------------------|------------------------------|-----------------------|----------------------|-----------------------------------|
| | Total Population | No. Primary Cases | Per cent Total Primary Cases | No. Contacts Examined | No. Contacts with TB | Per cent Morbidity among Contacts | Total Population | No. Primary Cases | Per cent Total Primary Cases | No. Contacts Examined | No. Contacts with TB | Per cent Morbidity among Contacts |
| 0-9 | 238 | 1 | 0.37 | 237 | 3 | 1.2 | 237 | 2 | 0.97 | 235 | 6 | 2.6 |
| 10-14 | 104 | 2 | 0.39 | 102 | 4 | 3.9 | 122 | 6 | 2.9 | 116 | 11 | 9.5 |
| 15-19 | 71 | 2 | 0.74 | 69 | 8 | 11.6 | 89 | 18 | 8.7 | 71 | 9 | 12.7 |
| 20-24 | 57 | 18 | 6.6 | 39 | 5 | 12.8 | 84 | 27 | 13.1 | 57 | 12 | 21.0 |
| 25-29 | 75 | 29 | 10.7 | 46 | 6 | 10.9 | 107 | 49 | 23.8 | 58 | 7 | 12.1 |
| 30-39 | 161 | 84 | 30.9 | 77 | 4 | 6.5 | 159 | 52 | 25.2 | 107 | 13 | 12.1 |
| 40-49 | 122 | 73 | 26.8 | 49 | 4 | 8.2 | 116 | 35 | 17.0 | 81 | 5 | 6.2 |
| 50-59 | 42 | 29 | 10.7 | 13 | .. | .. | 36 | 5 | 2.4 | 31 | .. | .. |
| 60-69 | 15 | 8 | 2.9 | 7 | .. | .. | 11 | 5 | .. | 6 | .. | .. |
| 70+ | 6 | 2 | 0.72 | 4 | .. | .. | .. | .. | 3.4 | .. | .. | .. |
| Not stated | 25 | 25 | 9.2 | .. | .. | .. | 7 | 7 | .. | .. | .. | .. |
| Total | 916 | 273 | 100.* | 643 | 34 | 5.3 | 968 | 206 | 100.* | 762 | 63 | 8.3 |

* Approximate

hold population under 30 years of age a significantly higher morbidity rate is obtained in females; above this age a higher morbidity is obtained in males. For the total contacts of primary cases a significantly higher attack rate is found in females as compared with males, i.e., 8.3 cf 5.3 per cent. These rates are similar to those obtained in the total sanatorium population exposed to living household cases, i.e., 8.8 cf 5.0 per cent (v.s. Table 1).

IV. ADDITIONAL FACTORS INFLUENCING MORBIDITY

A total of 65 breakdowns occurred in 60 families; in 5 families 2 breakdowns occurred simultaneously. Ten breakdowns showed x-ray evidence of hilar calcification. The results of the Mantoux test at the time of initial examination were as follows:

| | |
|--|----|
| Positive to .01 mg. OT..... | 49 |
| Positive to 1 mg. OT..... | 5 |
| Negative to both doses..... | 5 |
| Negative to .01 mg. OT, 1 mg. OT not given.. | 5 |
| No test | 1 |
| Total | 65 |

Of 20 patients who had been previously tested in the Chadwick Clinics (see below), 5 were reported positive and 15 negative to the Von Pirquet test.

In order to determine with the material available what factors about the patient and family influenced morbidity subsequent to initial examination, two groups of families were compared: (1) those families referred to as "breakdown" families in which some member developed tuberculosis while

under observation, and (2) a random sample of families in which no "breakdown" was observed. Of 208 contacts of "breakdown" families, 52 had been previously tested with tuberculin in the Chadwick Clinics sometime prior to admission to the sanatorium outpatient clinic. These tests were employed routinely in the school population as a screening method in a case finding program. It is to be emphasized that the data accumulated in the Chadwick Clinics are independent of the present study. That is, the data of each patient examined in the sanatorium clinic were coded according to family group, and reference was then made to the Chadwick Clinic records to determine whether results of routine tuberculin tests according to Table 10 were available. Of the control group of families, 67 of a total of 608 contacts studied had been previously tested. The average age at the time of the school test was 11 years, and that at the time of examination in the OPD clinic 15½ years.

The tuberculin reaction in the Chadwick Clinics among these 119 individuals is presented in Table 10. The per cent infected at the time of the school test is lower in the "breakdown" families as compared with the control group; the difference is greater than would be expected by chance alone ($\chi^2 = 5.10$).

The duration of illness of the primary case (see Part III) was employed as an index of the duration of exposure of other household members. The duration of exposure was measurable in 49

TABLE 10
Results of School Tests with Tuberculin According to Family Group

| Tuberculin Reaction | Breakdown | | Non-breakdown | | Total | |
|---------------------|-----------|----------|---------------|----------|-------|----------|
| | No. | Per cent | No | Per cent | No. | Per cent |
| Positive | 15 | 28.9 | 33 | 49.4 | 48 | 40.3 |
| Negative | 37 | 71.1 | 34 | 50.6 | 71 | 59.7 |
| Total | 52 | 100 | 67 | 100 | 119 | 100 |

TABLE 11

Duration of Exposure by Family Group

| <i>Duration of Contact</i> | <i>Families with Breakdown</i> | | <i>Families without Breakdown</i> | | <i>Total</i> | |
|--------------------------------|------------------------------------|-----------------|---------------------------------------|-----------------|--------------|-----------------|
| | <i>No.</i> | <i>Per cent</i> | <i>No.</i> | <i>Per cent</i> | <i>No.</i> | <i>Per cent</i> |
| Less than 1 year | 30 | 61.2 | 71 | 43.6 | 101 | 47.6 |
| Greater than 1 year | 19 | 38.7 | 92 | 56.4 | 111 | 52.4 |
| Total | 49 | 100 | 163 | 100 | 212 | 100 |

of the 60 "breakdown" families. These families were compared with a random sample of 163 families in which no breakdown occurred. The mean duration of exposure (expressed in months) of contacts was found to be 20.53 ± 1.26 in "breakdown" families as opposed to 31.97 ± 1.22 in the "control" families. The difference is statistically significant. These results are confirmed by a comparison of whole families. It was thought that the influence of size of family on the mean duration of exposure per person was thereby eliminated. A summary of the findings as expressed in Table 11 reveals a shorter duration of contact in "breakdown" families ($\chi^2 = 4.63$, $p = .031$).

The low rate of breakdown reported in Part II might possibly be explained by the above results. Evidence of more recent infection as measured by the tuberculin test and duration of exposure is obtained in "breakdown" families when compared with families in which a breakdown was not observed. It would appear that, in clinic practice, by the time the tuberculous patient seeks medical aid all susceptible contacts have already developed the disease.

V. TUBERCULOSIS FATALITY

The prognosis as to life expectancy of all tuberculous patients was calculated as of the time of examination at the Middlesex Clinic. The method used for the accumulation of the data must necessarily be explained for proper interpretation of Table 12. The

patients were followed for a varying number of years depending on the year of diagnosis. For example, those first examined as early as 1931 could have been followed for a maximum of 8 years, whereas those first examined in 1938 could have been followed for no more than 1 year.

Of 1,212 cases of pulmonary tuberculosis diagnosed at the sanatorium clinic, 130 gave a history of previous diagnosis and treatment. The latter patients are excluded from this part of the study. Thus, the 1,082 patients included in calculating the mortality experience represent new cases, diagnosed for the first time anywhere. Although not all patients were followed in the hospital ward or clinic, data on each patient up to the time of death or time of this study were obtained through other sources of information. Thus, if a patient refused hospitalization or dropped from the clinic against advice, additional information about the patient was sought by (1) examination of state vital statistics reports for possible cause and time of death, (2) reports by health department personnel, i.e., visiting nurses associated with the state-wide reclassification clinics, and (3) reports of diagnosis obtained from general hospitals and other sanatoria. Some patients, who were known to have moved out of the state and whose whereabouts was unknown at the time of study, are included. Their number, however, is too small to affect the results. The method used for determining the case fatality rates is essentially the same as

TABLE 12

Mortality of Cases of Tuberculosis by Stage during 8-9 Years Following Diagnosis

| <i>Year of Follow-up</i> | <i>Average Number at Risk</i> | <i>Number Dying of Other Causes during Year</i> | <i>Number Dying of Tuberculosis during Year</i> | <i>Percentage Dying of Other Causes during Yr.</i> | <i>Percentage Dying of Tuberculosis during Yr.</i> | <i>Percentage Dying of Other Causes during Preceding and Current Yr.</i> | <i>Percentage Dying of Tuberculosis during Preceding and Current Yr.</i> |
|----------------------------|-------------------------------|---|---|--|--|--|--|
| <i>Far Advanced</i> | | | | | | | |
| 1st year | 515 | 3 | 127 | .58 | 24.6 | 0.58 | 24.6 |
| 2nd year | 379 | 1 | 48 | .26 | 12.7 | 0.84 | 34.2 |
| 3rd year | 282 | 1 | 20 | .36 | 7.1 | 1.2 | 38.8 |
| 4th year | 216 | 1 | 17 | .46 | 7.9 | 1.7 | 43.7 |
| 5th year | 145 | .. | 8 | ... | 5.5 | 1.7 | 46.8 |
| 6th year | 97 | .. | 1 | ... | 1.0 | 1.7 | 47.3 |
| 7th year | 55 | .. | 1 | ... | 1.8 | 1.7 | 48.2 |
| 8th year | 27 | .. | .. | ... | ... | 1.7 | 48.2 |
| 9th year | 1 | .. | .. | ... | ... | 1.7 | 48.2 |
| <i>Moderately Advanced</i> | | | | | | | |
| 1st year | 334 | 4 | 3 | 1.2 | .90 | 1.2 | 0.90 |
| 2nd year | 320 | .. | 4 | ... | 1.2 | 1.2 | 2.1 |
| 3rd year | 279 | 3 | 9 | 1.1 | 3.9 | 2.3 | 5.9 |
| 4th year | 195 | 2 | 3 | 1.0 | 1.5 | 3.3 | 7.3 |
| 5th year | 142 | .. | 3 | ... | 2.1 | 3.3 | 9.3 |
| 6th year | 92 | 1 | 2 | 1.1 | 2.2 | 4.3 | 11.3 |
| 7th year | 52 | .. | .. | ... | ... | 4.3 | 11.3 |
| 8th year | 26 | .. | .. | ... | ... | 4.3 | 11.3 |
| <i>Minimal</i> | | | | | | | |
| 1st year | 233 | 2 | 1 | .86 | .43 | 0.86 | 0.43 |
| 2nd year | 218 | 2 | .. | .92 | ... | 1.8 | 0.43 |
| 3rd year | 192 | 1 | .. | .52 | ... | 2.3 | 0.43 |
| 4th year | 158 | 1 | 2 | .63 | 1.27 | 2.9 | 1.7 |
| 5th year | 121 | .. | 1 | ... | .83 | 2.9 | 2.5 |
| 6th year | 79 | .. | 2 | ... | 2.54 | 2.9 | 5.0 |
| 7th year | 41 | 1 | .. | 2.44 | ... | 5.3 | 5.0 |
| 8th year | 18 | .. | .. | ... | ... | 5.3 | 5.0 |

that recommended by Puffer, et al.¹ In the method employed by these authors it is assumed that the median duration of follow-up of patients dropped from observation during any one year is 6 months. In the present analysis, however, the length of follow-up is expressed to the nearest year.

The cumulative death rate shown in the last column of Table 12 is obtained by the life table method and represents the probability of death within a year. In far-advanced cases, for example, it is seen that the percentage dying of tuberculosis during the first and second years is 24.6 and 12.7 respectively. Thus, since 75.4 and 87.3 per cent survive the first and second years, the proportion of the original number (515)

who survive through 2 years is $75.4 \times 87.3 = 65.8$ per cent. The risk of dying within the first 2 years is, as shown in the last column, $100 - 65.8 = 34.2$ per cent. Similarly, the risk of dying within 6 years is 47 per cent. In minimal and moderately advanced cases the risks of dying within 6 years are 5 and 11 per cent respectively. The cumulative death rate due to other causes was derived by the formula $r = r_1 + r_2 + \dots + r_n$. This method is applicable when the rates are small.

SUMMARY AND DISCUSSION

In this study the comparative incidence of tuberculosis according to relationship of contact to exposure case re-

veals a significantly lower rate in consorts as compared with other familial contacts. Although comparative morbidity of household contacts has not been a subject of study, a review of the literature on conjugal tuberculosis reveals interesting controversial findings and conclusions. Rowland² and Gaetano³ found that tuberculosis in both husband and wife was relatively infrequent. On the other hand, a high incidence of conjugal tuberculosis is reported by Opie and McPhedran,⁴ and Spector.⁵

The discrepancy in such findings is partly explained by Sopp⁶ and Kayser-Petersen,⁷ who showed that age was an important variable to be considered in a study of comparative morbidity, the incidence of tuberculosis in consorts of younger age groups being greater than that of older age groups. Similar results were obtained with a study of records at the Henry Phipps Institute by Paterson,⁸ who also concluded that the mortality in consorts is significantly higher than would be expected among people of similar color and age in the general population of the same district. It should be noted that the present study differs from the above mentioned, in that morbidity was compared in a select group, i.e., contacts of household cases. In this specific group it is shown that the morbidity among consorts is lower than that among other household contacts.

In patients examined because of contact the morbidity rate in females is greater than that in males regardless of age and relationship of exposure cases; in patients examined for reasons other than contact the morbidity in females is greater than that in males in younger age groups, whereas the reverse is true in older age groups. In a routine roentgen survey of 12,603 inmates of the Southwestern State Hospital, Blalock, Funkhouser and Flannagan⁹ found that the incidence of x-ray evi-

dence of tuberculous disease was greater in females than males, the ratio of the attack rates being 2:1. Holm¹⁰ concluded that in Copenhagen tuberculous morbidity is equal for both sexes up to age 30, but after 30 it is more prevalent among men; in rural districts tuberculosis is more frequent in women than in men. In a report by Hutchinson and Pope¹¹ on tuberculosis among school children of 79 Massachusetts cities and towns, the morbidity rate was found greater in females than males in all ages between 5 and 15 years.

In the present study it is shown that the rate of development of tuberculosis as observed in the out-patient clinic is, on the whole, comparable to that of the general population. As in the findings on initial examination, the breakdown rate is higher in females. Families in which a member was observed to develop tuberculosis showed evidence of more recent infection as measured by the results of the tuberculin test and duration of exposure when compared with a control series of families without breakdown. Horton¹² reports from his experience in the clinics of the Homer Folks Hospital that practically all cases were found at first examination. Haywood, Morriss, and Wilson¹³ in a study of duration of contact emphasized the importance of short periods of contact, the 12 months period containing 44 per cent of manifest cases. Downes¹⁴ in a study of the tuberculosis records of Cattaraugus County found that the incidence of secondary cases among family contacts was highest within the first 2 years after exposure with a rate of 3.6 per 100 persons within the first year and 1.6 within the second year after exposure to familial tuberculosis, the attack rate remaining at a low level after the second year. It would appear from such findings and those of this report that most of the cases of tuberculosis have developed before an indication for examination for

tuberculosis has been called to the attention of the clinic.

Pope, Sartwell, and Zacks,¹⁵ in reporting the cumulative morbidity in children as observed in the Chadwick Clinics, estimated a rate of 3.19 per 100 after 7-8 years of observation, as opposed to 3.31 per 100 found in this study. The rate of breakdown by sex during the same period of observation as reported by the above authors was 1.72 for males and 4.41 for females. These rates are markedly similar to the results of the present study, i.e., 1.71 for males and 4.66 for females.

In the present study of 479 complete families, the tuberculous morbidity rate in contacts is shown to be 6.9 per cent. Jessel¹⁶ reported a rate of 7.5 per cent in Lancashire. Similarly, Turner in Worcestershire¹⁷ reported a rate of 8.2 per cent in contacts of tuberculous families. In this country, Haywood, Morriss, and Wilson¹³ determined a morbidity rate in contacts of 8.4 per cent in a study of 156 families examined at the Gaylord Farm Sanatorium in Connecticut.

The survival time according to stage of disease is presented. The case fatality rates for the period of 6 years after initial examination are: minimal, 5 per cent, moderately advanced, 11 per cent, far-advanced, 48 per cent.

Numerous studies on death rates of tuberculosis patients following admission or discharge from sanatoria have been published since the literature was reviewed by Hilleboe¹⁸ and Brieger.¹⁹ Puffer, Stewart, and Gass^{20, 21} reported on the mortality rates of cases of tuberculosis observed in Williamson County, Tenn., in which hospitalization facilities were not available. The mortality of tuberculous cases within 4 years following first classification was 73.1 per cent of far-advanced cases and 40.9 per cent of moderately advanced cases, as opposed to 43.7 and 7.3 per cent in the present study.

Hilleboe (v.s.), using the basic data from Brompton Hospital, England, for the years 1905-1914, estimated the percentage dead 5 years after discharge from the hospital as follows: far-advanced 79, moderately advanced 40, minimal 10. The same author²² in presenting statistics on death rates of patients discharged from public sanatoria in Minnesota during the years 1926-1935, reported the following rates for the period of 6 years after discharge: minimal negative-sputum group, 3.6 per cent; moderately advanced group, positive sputum, 11.4 per cent; far-advanced group, positive sputum, 74.6 per cent, and negative sputum 20.9 per cent.

Gauld, et al.²³ analyzed the data on all persons discharged from the various tuberculosis sanatoria of Maryland during the years 1934-1938. Of far-advanced cases 29 per cent were dead 1 year after discharge, and 62 per cent at the end of 5 years. The mortality of those patients with moderately advanced lesions was 7 per cent within a year and 25 per cent within 5 years after discharge. Of the minimal cases, 1.5 per cent died within 1 year and approximately 6 per cent within 5 years. It is apparent to the reader that the various studies including the present report are not strictly comparable in the sense that adjustment for such factors as age, sex, and sputum findings is necessary for comparative purposes.

CONCLUSIONS

From a statistical viewpoint the behavior of tuberculosis can best be studied in an unselected group. However, the following conclusions are drawn from a study of the records of a county tuberculosis sanatorium:

1. If age and sex are kept constant the attack rate among consorts is lower than that among other household contacts.
2. Females are more susceptible to tuberculosis than males.

3. Practically all cases of tuberculosis are diagnosed on single examination; the rate of development of tuberculosis in patients negative on initial examination is the same as that of the general population.

4. A study of 479 completely examined households with at least one living case of tuberculosis reveals a total morbidity of approximately 7 per cent in contacts. Of the total examined, the morbidity rate is higher in females than males up to the age of 30 years; in contacts of primary cases the morbidity rate in females exceeds that of males in all ages.

5. The survival time of tuberculous patients is presented. The case fatality rates for 6 years following initial examination are: minimal, 5 per cent; moderately advanced, 11 per cent; far advanced, 48 per cent.

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Effect of War Upon the Minds of Children*

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THERE are several reasons why we emphasize children's programs during war. The chief reason is that children are one of the important reasons for fighting for the preservation of our country and our way of life. We are most concerned about them and their heritage.

Since the environmental factors which determine mental health or mental ill health have been established, one method of approach to the question: "What is the effect of war upon the minds of children?" is to describe briefly the environmental conditions which promote mental health and then to apply those general principles to war situations.

ESSENTIALS FOR MENTAL HEALTH

The essentials for mental health are: security and an opportunity to grow according to individual patterns. The child then develops the self confidence which leads to the acquisition of habits of responsibility and of self reliance which in turn gives him the courage to face the problem of life and make a successful adjustment in society.

The first essential for mental health is *security*. This is the feeling which is given a child from birth by parents who wanted a child and who accept him as he is, no alterations being necessary. Since the younger the child

the greater this particular emotional need, most security is given by parents or parent substitutes. For the older child there is need for security from the family, the school, the community, and the nation. As indicated above, from this security boys and girls develop the self confidence that leads to self reliance in adulthood.

The second essential for mental health is to let children grow up according to their individual patterns. In order to do this, it is necessary for parents, teachers, and others to recognize the innate potentialities for growth and development in children, to determine children's individual differences, and learn what is normal for each age. Standards of behavior adapted to the age and capacity of the individual child permit a maximum growth. Environmental expectations which are beyond the youngster's grasp create confusion which results in fear and resentment. With this short description of basic principles, let us consider the influence of war upon mental health.

WAR AND MENTAL HEALTH

Since security is given largely by parents (especially in young children), their attitude and, therefore, the attitude of adults toward war is of great importance. This brings up the whole question of morale. There is no doubt but that children can "take it" if their parents can. In this connection, the first thing for all of us to do is to face the situation and admit that we are

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somewhat scared. That is nothing of which we should be ashamed. The uncertainties which surround most families together with the real dangers to which some of them will be exposed are normal stimulants of fear. Actually to be a little scared is good for it stimulates activity and, with its close ally resentment, promotes determination.

Every family should appraise the situation in which it finds itself. The aim of every individual should be directed toward the national aims and the support of the government in its determined efforts. Submission to authority is good for civilian as well as for military morale. The lessening of individual competition and the coöperation of all working together gives everyone satisfaction. On the other hand, the expression of hates which are not permissible during peacetime contributes to a lowering of personal morale during war. When individuals and families have determined the probable rôle they are to play in the war, they should make plans to meet it. The changes which may take place within the family and community should be discussed with the children in order that they may decide how to meet the eventualities as and if they arise. Children who are old enough to understand can get a great deal of benefit as well as satisfaction out of helping to devise such a program. Every member of the family should have a part to play. Having worked out procedures for possible changes in the family routine and emergencies, the children as well as the parents should carry on as nearly as possible their regular routine. It should be kept constantly in mind that children imitate their parents.

AGE DIFFERENCES

The effect of war upon children depends upon the age of the child. Even

infants from birth are disturbed by anxieties of parents. The effect upon the young baby of apprehension in the mother is observed frequently by every physician.

Preschool children are most frightened by separation from their parents. In England, for example, they have shown the greatest anxiety when they were separated from their parents during blackouts. Small children have no conception of war. To them Hitler is analogous to the "bogeyman" and other supernatural symbols. Their mental health depends upon the security they feel in their parents and home. When father is out of the home for long hours because of work or being away from home, their security depends upon mother's ability to take charge and make them feel that everything is all right. Those mothers whom I have observed are doing a remarkably fine job of managing their families without the aid of their husbands.

PROBLEMS IN DEFENSE INDUSTRIAL AREAS

There are a great many disruptions of homes, however, which are causing serious harm to the physical and mental health of children. I refer to those families in which fathers are away and the mothers are working in war factories. The children of all ages are left home without adequate supervision or general care. Mothers go home after 8 hours of work, 6 days a week, and often do the family washing and heavy housework. They are tired, and often cannot help being irritable toward their children. The extent of the problem is illustrated by one war plant in the middle west which employs about 1,400 women. This plant runs three shifts, 7 days a week, each employee having one day off each week. Fifty per cent of these workers are married women and a great many have from one to seven children. They have been found

to be reliable, efficient employees except that they often become fatigued and have to leave or must quit because they can find no one to keep track of their children—not to mention the care of them. These women live in all parts of the city. There are insufficient nursery schools—and those open but 6 days a week when the factory runs 7—to care for those who work on the day shift, and no means has been devised to help those who work on the afternoon and night shifts. There has been a considerable amount of discussion of this problem but there has been no relief to the children of these workers. Unless immediate measures are taken to give them supervision and care, we can prognosticate serious physical and mental ill health for them.

The rapid growth of war factories in small towns and out in the country has created another situation which threatens the health (both physical and mental) of the children of employees in those plants. The population of many villages has increased so rapidly that the health, sanitary, recreational, and school facilities are wholly inadequate to take care of the increased load, and the communities are not financially able to meet the situation. Trailer camps and make-shift villages which have experienced a mushroom growth create other problems. Here, too, mothers often work, leaving their children to shift for themselves. Unless some means are made for providing facilities for the care of these children, we can confidently expect epidemics and mental ill health among them.

Children of school age retain their anxieties of previous years but are old enough to have a concrete conception of war. They think more about bombings and what may happen to them. Possible loss of home, less food and clothing, are of real concern to them. They are afraid that father who is in the army may be killed.

During the ages of 9 to 13 years there are fewer serious anxieties, according to the experience of the British, than in younger or older children. During this period youngsters like to dramatize events in life and thereby act out their feelings. In this way, a part of their tension is relieved. Although they are scared, the idea of war appeals to them.

The adolescents carry the anxieties of childhood together with the problems peculiar to their age. Everyone will agree that the hardships of war fall heavily upon youth. They are expected to grow up more rapidly, often assume responsibilities beyond their level of growth; their education, vocation, marriage and start in life must be postponed for an indefinite period. This change is not entirely on the red side of the ledger, however. For those adolescents who are sufficiently mature, the war situation offers an opportunity to develop their abilities and make a more successful adjustment than during peacetimes. Nearly all of them, however, are faced with attitudes both within and without the home, which are opposite to the kind they faced during childhood. I refer to the fact that for twenty-five years we have been teaching our children that war is wrong and other fairy book stories which are contrary to the hard facts of life. Their ability to adjust successfully to our rapidly changing philosophy of life is one reason for saying that democracy works and is a glowing tribute to American parents and youth.

Uncertainty always stimulates anxiety. Youths hear would-be prophets predict national bankruptcy, depression, and the end of opportunity in America. These reports are disturbing and contribute to undesirable propaganda and lowered morale. As they grow up, children and youth need security in their community, church, and nation. The pessimistic remarks,

especially of those in high places make far-reaching impressions on their minds.

CHANGES IN BEHAVIOR

Having briefly described some of the conditions which surround children at the present time, and indicated the reasons for anxieties stimulated by war, we are next interested in the behavior changes which may be expected. They vary with the age of the child. Infants respond to restlessness, crying, and unhappiness. Preschool children may become negativistic and evasive, may stammer, have enuresis, and night terrors or they may become irritable and disobedient. I saw a 4 year old girl recently who developed a poor appetite and became very disobedient after her mother returned from visiting the little girl's father who was in the army. School children may react to their anxieties by expressing their fears and demanding frequent reassurance. Other signs of their insecurities may be poor school work, compulsive stealing and vandalism. Sometimes insecure, frightened children become tyrants at home and are examples of the popular misconception of "spoiled children." Adolescents react to their symptoms by neurotic complaints such as abdominal distress, rapid heart rate and weakness, or by truancy and delinquency, the most serious being sex delinquency.

SPECIFIC MEANS OF HELPING CHILDREN

I have already indicated the general measures which may be taken to minimize the effects of war upon the minds of children. Let us now consider some of the specific means of aiding them. Adults and children can be given a great deal of help and their anxieties can be lessened by adjusting their emotional needs to the conditions of war. The wave of determination to devote our all-out efforts to win this war, and the certainty in our minds that it will be won, together with the

unity of effort which has developed in the last 10 months, has done much to improve general and individual morale and lessen anxieties in adults.

With higher parental morale the morale of children is increased. Young children can be relieved of anxieties in proportion to the security they feel in their parents. Every effort should be made to keep them with their parents. It is especially important during black-outs because they feel safe only when they are very close to them. When father is out of the home, mother can give adequate security if a well organized and well thought-out plan is made wherein everyone knows what to do in case of emergency, and if the children are made to feel that their mother will be there to see that everything is all right.

Children can get a great deal of satisfaction out of developing a plan for an air raid shelter and they learn how to play and do things together as well as indulge in constructive play which aims to help others when they help in the preparation of a bomb shelter. In the absence of both parents children can be made to feel secure by a mother substitute who is capable and who knows exactly what to do in case of an emergency.

"If you want to encourage a child to be brave," says Glover in a recent book, "you do not begin by telling him that he is silly; you encourage his sense of responsibility, give him something sensible and useful to do, show him a good example, tell him the truth, admit your errors and be friendly with him. He will do the rest himself." It is better not to indulge in a large number of drills; children do best if given a few simple directions and enough responsibility to feel that they play an important part in meeting an emergency.

Children of school age get additional relief from anxiety through free expression of thought in play. They can-

not be kept from hearing war news, and enjoy it too much to be deprived of it even if it were possible to do so. Parents, therefore, should discuss the war with them, help them to reject malicious propaganda and unfounded rumors, and assure them that the outcome will be victory for us. It is a good time to let them develop pride in our country and assurance of a better future. War games provide an excellent emotional outlet and should be encouraged. Boys and girls like to feel important and to believe they are a part of the victory program. This expression may be fostered by buying stamps, collecting scrap, messenger work, and helping the Red Cross. It is important for them to do these things only during their spare time and while the home is running on as near to a normal schedule as possible. Surely, there is no reason for shortening the school year or dispensing with any part of the curriculum.

PROBLEMS OF ADOLESCENTS

The adolescent may be given moral support and helped by giving him emotional outlets in terms of his emotional needs. At this age, boys and girls require security in their parents, their homes, the community, the church, and the nation, as well as praise for their efforts and opportunity compatible with their abilities and degree of emotional maturity.

Young men and women should feel that there is something they can do well, that there is a place in society for them now and that there will be an important place for them after the war is won. Since the military services cannot give every individual an opportunity to develop his particular abilities, it is important that there should be opportunities for them when they return to civilian life. When their emotional needs (feeling of expertness and knowledge of their importance) are

supplied, young people develop the self confidence that gives them the courage to meet difficult situations and make an adjustment to them.

The importance of training young men and young women is especially great in the mechanized warfare of the present time. Educational facilities for both vocational and professional training are useful for mental health as well as for the war effort. As a part of their training youths can be made to realize that they are not only important to their country, but that they are an important part of their country. American history, if properly taught, paves the way for the development and rationalization of love of country, and greater security by realizing more fully that this is *my* country and that there is an important place in it for *me*. American history could not be revised to conform more closely to the interests and emotional needs of the adolescent mind.

To young men and women, independence and adventure are of utmost importance. It should be pointed out to them that it was rebels who, seeking opportunity and adventure, founded and developed this country. They should be brought to recognize that their first ancestors in this country, whether they came over one or ten generations ago, felt the same way about life that they feel today. They can be made to feel that the days of adventure will not be over after the war. The land frontier, it is true, is gone, but the frontiers of science, with the possibilities of invention which are just beginning to be recognized, offer far greater opportunities for progress in the future than our forefathers dreamed possible.

Adolescents can be made to understand that this is the best country in the world for the expression of independence, opportunities for adventure, and real hope for achievement. The

basic principle of democracy is that individuals are important and each one has a voice in government, business and social life. In these ways young people can identify themselves with the past and be assured of the future, even though economic conditions may be serious. The war will only temporarily interfere with their life program. In the near future they will inherit the country because they will take their parents' place in the world. This, then, becomes *their* home and *their* country. And when they take over we can rest assured that they will do as good a job as we have done.

We can be of further help to youth by resisting the demoralizing propaganda of those depressed and dis-

couraged individuals who not only see the end of opportunity in this country but also the destruction of civilization and nothing to live for if our wealth is conscripted.

Finally, well developed and intelligently controlled and properly coördinated youth organizations are of great help. Recreational centers, scout troops, church groups, Y.M.C.A. and Y.W.C.A. schools, any well managed organization that gives boys and girls and young men and women wholesome emotional outlets and constructive social activities will prevent personal and moral deterioration that is threatened by war. There is a pressing need for coördinated youth programs in every community.

Losses of Vitamins Which May Occur During the Cooking of Dehydrated Vegetables^{*†}

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BECAUSE dehydrated vegetables are now being used in large amounts by our armed forces and in increasing amounts by civilians at home and abroad, it is important to know the nutritive value of these vegetables at the time they are actually consumed. Directions given at present for cooking dehydrated vegetables vary from starting them in cold water to starting them in boiling water; from no refreshing ‡ to refreshing them overnight, and from cooking them in small amounts of water to cooking them in as large amounts as 8 quarts of water to 1 pound of vegetable.

The work reported in this paper was part of a study of the nutritive value and palatability of dehydrated vegetables carried out coöperatively with the U. S. Bureau of Home Economics,

the University of California, and the University of Texas. The purpose of the particular study herein presented was to determine some of the factors which affect the losses of vitamins from commercially dehydrated vegetables during cooking procedures. Four commercially dehydrated vegetables—beets, cabbage, potatoes, and rutabagas—were cooked in family and in quantity amounts.

In cooking family amounts the object was to determine losses (1) of thiamin when the vegetables were (a) started in boiling water (98° C.) and started in cold water (20° C.), (b) cooked without and with refreshing, and (c) cooked in varying amounts of water; (2) of ascorbic acid from the cabbage when it was (a) put in boiling water (98° C.), and in cold water (20° C.), (b) cooked without and with refreshing, and (c) cooked in varying amounts of water; (3) of carotene from commercially dehydrated rutabagas cooked in varying amounts of water.

In cooking quantity amounts the object was to determine the losses of thiamin during steaming. Because it is common procedure to "hold" such

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‡ "Refreshing" is the term generally applied to the preliminary soaking of dehydrated products.

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vegetables before serving them, the losses of thiamin due to holding the steamed vegetables for 1 hour in a steam-heated warming oven were determined.

METHOD

History of vegetables—The history of these vegetables as well as the losses of thiamin, carotene, and ascorbic acid from them during dehydration and storage are reported by Moyer, Wheeler, and Tressler.¹

Family cookery procedures—Each vegetable was cooked in 50 gm. lots. This amount gave 4 to 5 servings. Covered, straight-sided 1 qt. enamel pans were used. The pans had a diameter of 5 in. and a depth of 3½ in. The rate of evaporation was controlled by a manometer which was placed between the gas outlet and the stove.² In each case the vegetable was brought quickly to the boiling point, and then boiled gently. Gentle boiling, or simmering, gave a more desirable texture in the cooked product than did rapid boiling.

To determine the effect of the initial temperature of the water on losses of thiamin, each vegetable was put into water at 20° C., and at 98° C., and was cooked with no preliminary soaking (Table 1). To determine the effect of refreshing, each vegetable was cooked with no preliminary soaking, and cabbage, potatoes, and rutabagas were cooked after preliminary soaking (Table 2). To determine the effect of using various amounts of water, all the vegetables were cooked in minimum amounts of water with not more than 80 gm. of water left at the end of the cooking periods, and in larger amounts of water (Table 3).

Cabbage was the only one of the four dehydrated vegetables which contained sufficient ascorbic acid for study. It was cooked with the above variables (Tables 4, 5, and 6) and the effect on

the ascorbic acid content of the cabbage was determined.

Rutabagas were the only vegetable in the group which contained sufficient carotene for study. The effect of varying the amount of water (Table 7) on the retention of carotene was determined. Because the carotene content decreased quite rapidly during storage, it was not possible to determine the effect of the other cookery variables on its retention.

*Quantity cookery procedures*¹—The dehydrated vegetables were steamed in 454 gm. lots. This amount gave 12 cups of beets, 28 cups of cabbage, 12 cups of potatoes and 20 cups of rutabagas. The losses occurring with these amounts were considered indicative of those which might occur in certain quantity procedures.

The vegetables were put in aluminum pans having a depth of 5½ in., a bottom diameter of 10½ in., and a top diameter of 13 in. The amounts of boiling water (Table 8) added to each vegetable were such that they resulted in a product of good texture and practically all of the cooking water was absorbed at the end of the "holding" period.

The pans of vegetables were placed in a standard type free-venting commercial steamer operating with live steam introduced directly into the cooking chamber. The steaming times are given in Table 8.

"Holding" of quantity steamed vegetables—The steamed vegetables were transferred in 454 gm. lots with a proportionate amount of cooking water to aluminum pans having a depth of 7 in., a diameter of 4½ in., and a capacity of 1¾ qts. They were then placed in an institutional steam-heated warming oven where they were held for 1 hour.

Vitamin determinations—The thiamin determinations were made by the method recommended for cereals by the

Research Corporation Committee on the Thiochrome Method³ as adapted for vegetables by Moyer and Tressler.⁴ The ascorbic acid determinations were made by the Bessey and King⁵ method as modified by Mack and Tressler⁶ and further modified by the use of the Waring Blendor for grinding the samples. The carotene determinations were made by the method of Zimmerman, Tressler, and Maynard.⁷

RESULTS

At the time of testing the uncooked dehydrated beets contained 1.7 micrograms of thiamin per gm., the potatoes 4.3 μ g. and the cabbage and rutabagas 5.3 μ g. per gm.

COOKING IN FAMILY QUANTITY

(1) THIAMIN LOSSES

The initial temperature of the cooking water made no appreciable difference in the per cent of thiamin retained (Table 1) except in the case of the potatoes. The differences, with this exception, were within experimental error, as were also the apparent increases in the thiamin content. Very little difference was observable in the

per cent solution of thiamin; probably no destruction of thiamin took place.

When the vegetables were put in cold water it required from 3½ to 5 minutes for the water to come to the boil (Table 1); when they were put in boiling water, the water did not stop boiling.

Refreshing—Whether the cabbage, potatoes, and rutabagas were cooked without first refreshing them or after 30 minutes of refreshing (in the case of cabbage, 60 minute refreshing) in water at 20° C. made no appreciable difference in the retention of thiamin in the cooked vegetable (Table 2). The smaller percentage retention in the cooked potatoes than that in the other vegetables and the larger loss to the cooking water were probably due to the larger amount of water used, 550 gm. for potatoes against 400 gm. for cabbage and 300 gm. for rutabagas. There was probably no destruction of thiamin.

Amount of cooking water—As shown in Table 3, with each increase in the amount of cooking water more thiamin was dissolved from each of the four vegetables into the cooking water. By doubling the amount of water in cook-

TABLE 1

Effect of Varying the Initial Temperature of Cooking Water on the Thiamin Content of Four Dehydrated Vegetables¹

| Vegetable | Initial Temperature of Cooking Water ° C. | Time Required for the Water to Return to the Boil minutes | Thiamin | | | | | | |
|-----------|---|---|-----------------------|------------------|------------------------------|----------------------------|-------------------------|---------------------------------|-------------------------------------|
| | | | Per Gram of Vegetable | | Total | | | Retention in Vegetable per cent | Dissolved in Cooking Water per cent |
| | | | Uncooked microgram | Cooked microgram | Uncooked Vegetable microgram | Cooked Vegetable microgram | Cooking Water microgram | | |
| | | | | | | | | | Change per cent |
| Beets | 20° | 4 | 1.7 | 0.34 | 85 | 70 | 17 | 82 | 20 |
| | 98° | 0 | 1.7 | 0.33 | 85 | 67 | 17 | 78 | 20 |
| Cabbage | 20° | 5 | 4.87 | 0.56 | 244 | 199 | 49 | 81 | 20 |
| | 98° | 0 | 5.08 | 0.63 | 254 | 216 | 54 | 85 | 21 |
| Potatoes | 20° | 3.5 | 4.34 | 1.0 | 217 | 225 | .. ² | 75 | 22 |
| | 98° | 0 | 4.23 | 0.97 | 212 | 228 | .. ² | 107 | .. ² |
| Rutabagas | 20° | 4 | 5.09 | 0.73 | 255 | 219 | 36 ³ | 86 | 14 ³ |
| | 98° | 0 | 4.78 | 0.81 | 239 | 217 | 34 | 90 | 14 |

¹ Each vegetable was cooked in 50 gm. lots with no preliminary soaking.

Beets were cooked in 250 gm. of water, cabbage in 400 gm., potatoes in 200 gm., and rutabagas in 300 gm.

Beets were cooked 25 minutes, cabbage 10, potatoes 15, and rutabagas 30.

² Not sufficient cooking water to analyze.

³ This figure includes the thiamin in the cooking water which was not analyzed and that destroyed.

TABLE 2

Effect of Refreshing Before Cooking on the Thiamin Content of Three Dehydrated Vegetables¹

| Vegetable | Refreshing Time minutes | Thiamin | | | | | | | |
|-----------|----------------------------|--------------------------|---------------------|------------------------------------|----------------------------------|-------------------------------|------------------------------|----------------------------|--------------------|
| | | Per Gram of Vegetable | | Total | | | Retention in Vegetable | Dissolved in Cooking | |
| | | Uncooked microgram | Cooked microgram | Uncooked Vegetable microgram | Cooked Vegetable microgram | Cooking Water microgram | per cent | Water per cent | Change per cent |
| Cabbage | none | 4.87 | 0.56 | 244 | 199 | 49 | 81 | 20 | +1 |
| | 30 | 4.87 | 0.53 | 244 | 189 | 56 | 77 | 22 | -1 |
| | 60 | 5.08 | 0.60 | 254 | 216 | 39 | 85 | 15 | 0 |
| Potatoes | none | 4.34 | 0.41 | 217 | 102 | 109 | 47 | 50 | -3 |
| | 30 | 4.34 | 0.38 | 217 | 108 | 99 | 50 | 46 | -4 |
| Rutabagas | none | 5.09 | 0.73 | 255 | 219 | .. ² | 86 | .. ² | |
| | 30 | 4.78 | 0.78 | 239 | 234 | 25 | 87 | 10 | -3 |

¹ Each vegetable was cooked in 50 gm. lots.

Amounts of cooking water were: cabbage, 400 gm., potatoes, 550 gm., rutabagas, 300 gm.

Temperature of water was: cabbage and rutabagas 20° C., potatoes, 20° C. and 98° C.

² Too little water to analyze (30 gm.).

TABLE 3

Effect of Increasing the Amount of Cooking Water on the Thiamin Content of Four Dehydrated Vegetables¹

| Vegetable | Amount of Cooking Water gm. | Thiamin | | | | | | | |
|-----------|--------------------------------------|--------------------------|---------------------|------------------------------------|----------------------------------|-------------------------------|------------------------------|----------------------------|--------------------|
| | | Per Gram of Vegetable | | Total | | | Retention in Vegetable | Dissolved in Cooking | |
| | | Uncooked microgram | Cooked microgram | Uncooked Vegetable microgram | Cooked Vegetable microgram | Cooking Water microgram | per cent | Water per cent | Change per cent |
| Beets | 250 | 1.7 | 0.34 | 85 | 70 | 17 | 78 | 20 | -2 |
| | 500 | 1.6 | 0.17 | 80 | 42 | 46 | 53 | 57 | +10 |
| Cabbage | 400 | 5.08 | 0.63 | 254 | 216 | 54 | 85 | 21 | +6 |
| | 700 | 4.87 | 0.34 | 244 | 126 | 113 | 52 | 47 | -1 |
| Potatoes | 200 | 4.34 | 1.00 | 217 | 225 | .. ² | 104 | .. ² | +4 |
| | 300 | 4.34 | 0.66 | 217 | 163 | 47 | 75 | 22 | -3 |
| | 550 | 4.34 | 0.41 | 217 | 102 | 109 | 47 | 50 | -3 |
| Rutabagas | 300 | 5.09 | 0.73 | 255 | 219 | 36 ³ | 86 | 14 ³ | |
| | 550 | 5.09 | 0.43 | 255 | 133 | 103 | 52 | 41 | -7 |

¹ Each vegetable was cooked in 50 gm. lots with no refreshing.

Temperature of the water: beets, potatoes, and rutabagas, 20° C., cabbage, 98° C.

² Too little water to analyze (6 gm.).³ This figure includes the thiamin in the cooking water which was not analyzed and that destroyed.

ing beets the retention of thiamin was decreased from 78 per cent to 53 per cent, and the solution of thiamin was increased from 20 per cent to 57 per cent. In cooking cabbage, by increasing the amount of water from 400 gm. to 700 gm., the retention of thiamin was decreased from 85 to 52 per cent. In cooking potatoes, by increasing the amount of water from 200 gm. to 300 and then to 550 gm., the retention of thiamin was decreased from 104 per cent to 75 per cent and 47 per cent, respectively, and the solution to the

cooking water was increased from 22 per cent with 300 gm. of water to 50 per cent with 550 gm. of water. In cooking rutabagas, by increasing the amount of water from 300 gm. to 550 gm., the retention of thiamin was decreased from 86 per cent to 52 per cent and the percentage dissolved was increased from less than 14 to 41 per cent.

(2) ASCORBIC ACID LOSSES FROM CABBAGE

Initial temperature of cooking water
—The uncooked dehydrated cabbage

TABLE 4

Effect of Increasing the Initial Temperature of the Cooking Water on the Ascorbic Acid Content of Dehydrated Cabbage¹

| Temperature of Water | Ascorbic Acid | | | | | | | |
|----------------------|--------------------|------------|----------------------|--------------------|-------------------|-------------------------------|-------------------------------------|-----------------|
| | Per gm. of Cabbage | | Total | | | Retention in Cabbage per cent | Dissolved in Cooking Water per cent | Change per cent |
| | Uncooked mg. | Cooked mg. | Uncooked Cabbage mg. | Cooked Cabbage mg. | Cooking Water mg. | | | |
| 20° | 4.1 | 0.17 | 205 | 56.7 | 25.0 | 28 | 12 | -60 |
| 98° | 4.1 | 0.42 | 205 | 145.3 | 35.9 | 71 | 18 | -11 |

¹ The cabbage was not blanched previous to dehydration.

It was cooked in 50 gm. lots in 400 gm. water without refreshing, 10 minutes.

contained about 4 mg. of ascorbic acid per gm. When the cabbage was started to cook in boiling water rather than in cold, the retention of ascorbic acid was increased from 28 to 71 per cent (Table 4). When cold water was used, 60 per cent of the ascorbic acid was destroyed, 28 per cent remained in the cabbage. When boiling water was used only 11 per cent of the ascorbic acid was lost and 71 per cent was left in the cabbage. The cabbage has not been blanched to inactivate the enzymes before dehydration. Since it took longer to bring the cabbage and cold water to the boiling point, the enzyme system which oxidizes ascorbic acid had a longer time to act than when boiling water was used. There was very little difference at the two temperatures in the per cent found in the cooking water.

Refreshing—When the cabbage was cooked without refreshing, with 30 minutes refreshing and with 60 minutes refreshing in water at 20° C., the retention of ascorbic acid was 28 per cent, 19 per cent, and 7 per cent, respectively, and the destruction was 60 per cent, 78 per cent and 90 per cent respectively (Table 5). As noted in Table 2, the retention would have been relatively greater and the destruction relatively less if the cabbage had been put in boiling water. It is probable that some of the dissolved ascorbic acid was also destroyed upon standing, because the per cent of ascorbic acid in the cooking water decreased with the length of the refreshing period.

Amount of cooking water—With an increase of cooking water from 400 gm. to 700 gm. the retention of ascorbic acid in the cabbage was de-

TABLE 5

Effect of Refreshing in Water at 20° C. Before Cooking on the Ascorbic Acid Content of Dehydrated Cabbage¹

| Refreshing Time minutes | Ascorbic Acid | | | | | | | |
|-------------------------|--------------------|------------|----------------------|--------------------|-------------------|-------------------------------|-------------------------------------|-----------------|
| | Per gm. of Cabbage | | Total | | | Retention in Cabbage per cent | Dissolved in Cooking Water per cent | Change per cent |
| | Uncooked mg. | Cooked mg. | Uncooked Cabbage mg. | Cooked Cabbage mg. | Cooking Water mg. | | | |
| 0 ² | 4.1 | 0.17 | 205 | 56.7 | 25.0 | 28 | 12 | -60 |
| 30 ³ | 4.1 | 0.09 | 205 | 32.5 | 12.8 | 19 | 6 | -75 |
| 60 ³ | 4.1 | 0.04 | 205 | 14.7 | 6.2 | 7 | 3 | -90 |

¹ The cabbage was not blanched previous to dehydration.

It was cooked in 50 gm. lots in 400 gm. water.

² Cooked 10 minutes.

³ Cooked 8 minutes.

TABLE 6

Effect of Increasing the Amount of Cooking Water on the Ascorbic Acid Content of Dehydrated Cabbage¹

| Amount of Cooking Water | Ascorbic Acid | | | | | | | |
|-------------------------------|--------------------|--------|---------------------|-------------------|------------------|----------------------------|----------------------------------|----------|
| | Per gm. of Cabbage | | Total | | | Retention in Cabbage | Dissolved in Cooking Water | Change |
| | Uncooked | Cooked | Uncooked Cabbage | Cooked Cabbage | Cooking Water | | | |
| | gm. | mg. | mg. | mg. | mg. | per cent | per cent | per cent |
| 400 | 4.1 | 0.42 | 205 | 145.3 | 35.9 | 71 | 18 | -11 |
| 700 | 4.1 | 0.26 | 205 | 96.5 | 57.1 | 47 | 42 | -11 |

¹ The unblanched dehydrated cabbage was placed directly in boiling water and cooked 10 minutes with no refreshing.

TABLE 7

Effect of Increasing the Amount of Cooking Water on the Carotene Content of Dehydrated Rutabagas²

| Amount of Cooking Water | Carotene | | | | |
|-------------------------------|----------------------|-----------|-----------------------|---------------------|------------------------------|
| | Per gm. of Rutabagas | | Total | | Retention in Rutabagas |
| | Uncooked | Cooked | Uncooked Rutabagas | Cooked Rutabagas | |
| | microgram | microgram | microgram | microgram | per cent |
| 300 | 13.5 | 2.22 | 675 | 664 | 98 |
| 550 | 13.5 | 1.66 | 675 | 534 | 79 |

¹ Fifty gm. lots of the rutabagas were placed in cold water and cooked 30 minutes with no refreshing.

² Total carotenoids.

creased from 71 per cent to 47 per cent and the solution was increased from 18 per cent to 42 per cent (Table 6). The destruction was the same in each case, 11 per cent. A similar effect of increasing the amount of cooking water on ascorbic acid retention has been reported for frozen peas, spinach, cauliflower, brussels sprouts, and lima beans,⁸ and for frozen broccoli.⁹

(3) CAROTENE IN RUTABAGAS

The uncooked dehydrated rutabagas at the time of testing contained 13.5 μ g. of carotene * per gm.

Amount of cooking water—Increasing the amount of cooking water from 300 gm. to 550 gm. decreased the retention of carotene in the rutabagas from 98 per cent to 79 per cent (Table 7). The carotene content of the rutabagas cooked in 300 gm. and in 550 gm. of water was 2.22 μ g. and 1.66 μ g. per

gm., respectively. Although carotene is relatively insoluble in water, the pieces of dehydrated vegetable were so small that it is possible that some of the carotene was dispersed in the water. The cooking water was used for the thiamin analyses and there was not sufficient for carotene analyses also.

QUANTITY COOKERY PROCEDURES

Steaming—The retention of thiamin during steaming was: beets 82 per cent, cabbage 88 per cent, potatoes 87 per cent, and rutabagas 74 per cent (Table 8). The remainder of the thiamin was dissolved in the small amount of water present. The thiamin content of the steamed vegetables was: beets, 0.34 μ g. per gm. of vegetable, cabbage, 0.64 μ g., potatoes 0.79 μ g., and rutabagas 0.68 μ g. (Table 8). The steamed beets and cabbage contained about the same amount of thiamin per gm. as they did when boiled in 50 gm. lots after being placed directly in boil-

* Total carotenoids

TABLE 8

Retention of Thiamin in Certain Dehydrated Vegetables during Steaming in Quantity¹

| Vegetable | Thiamin | | | | | | | |
|-----------|-----------------------|-----------|--------------------|------------------|---------------|------------------------|----------------------------|----------|
| | Per Gram of Vegetable | | Total | | | Retention in Vegetable | Dissolved in Cooking Water | Change |
| | Uncooked | Cooked | Uncooked Vegetable | Cooked Vegetable | Cooking Water | | | |
| | microgram | microgram | microgram | microgram | microgram | per cent | per cent | per cent |
| Beets | 1.6 | 0.34 | 726 | 595 | 83 | 82 | 11 | -7 |
| Cabbage | 4.63 | 0.64 | 2,102 | 1,848 | 572 | 88 | 27 | +15 |
| Potatoes | 4.34 | 0.79 | 1,970 | 1,719 | 322 | 87 | 17 | +4 |
| Rutabagas | 5.46 | 0.68 | 2,479 | 1,832 | 589 | 74 | 24 | -2 |

¹ Boiling water was added to 454 gm. of dehydrated vegetables.

Amount of water: beets, 2,006 gm.; cabbage, 3,776 gm.; potatoes, 2,360 gm.; and rutabagas, 3,304 gm.

Time of cooking: beets, 25 minutes; cabbage, 10; potatoes, 15; and rutabagas, 45 minutes.

ing water with no refreshing. In the latter study the thiamin content was beets, 0.33 μg . per gm., of vegetable and cabbage 0.63 μg . The steamed potatoes contained slightly less, and the rutabagas more than in the family quantity study.

were by the best method of boiling in family amounts, that is, placed directly in boiling water and cooked without refreshing. Steaming was not a satisfactory method for cooking the cabbage and rutabagas from the standpoint of flavor and odor.

TABLE 9

Retention of Thiamin in Certain Quantity Steamed Dehydrated Vegetables during Holding One Hour in a Steam-heated Warming Oven¹

| Vegetable | Thiamin | | | | | | | |
|-----------|----------------------|---------------|----------------------------|----------------|---------------|----------------------------|---------------------------------------|-----------------------|
| | Per gm. of Vegetable | | | Total | | | Retention during Holding ² | Change during Holding |
| | Before Holding | | After Holding ² | Before Holding | | After Holding ² | | |
| | Vegetable | Cooking Water | Vegetable | Vegetable | Cooking Water | Vegetable | per cent | per cent |
| | microgram | microgram | microgram | microgram | microgram | microgram | | |
| Beets | 0.34 | 0.16 | 0.34 | 154 | 14 | 176 | 105 | +5 |
| Cabbage | 0.64 | 0.53 | 0.62 | 288 | 53 | 341 | 98 | -2 |
| Rutabagas | 0.66 | 0.64 | 0.64 | 304 | 65 | 338 | 90 | -8 |

¹ The cooked vegetables in 454 gm. lots were held in pans in an institutional steam-heated warming oven.² Practically all of the cooking water was absorbed by the vegetables during holding.

Holding—When the steamed beets, cabbage, and rutabagas were held 1 hour in an institutional steam-heated warming oven they absorbed practically all of the cooking water. There was no appreciable loss of thiamin during the holding. The percentage changes (Table 9) were within experimental error.

Palatability—The vegetables were judged for appearance, color, odor, flavor, and consistency. The beets were judged excellent in all respects, the potatoes were rated as high as they

SUMMARY

1. The uncooked, commercially dehydrated beets contained 1.7 micrograms of thiamin per gm., on the dry basis, the potatoes 4.3 μg ., and the cabbage and rutabagas 5.3.

2. Increasing the initial temperature of the cooking water from 20° to 98° C. made no appreciable difference in the percentage of thiamin retained in the vegetable, dissolved in the cooking water, or destroyed.

3. Cooking the vegetables without refreshing, or after 30 minutes of refreshing, and also in the case of cabbage after 60 minutes of refreshing, made no appreciable difference in the percentage of thiamin retained in the vegetable, dissolved in the cooking water, or destroyed.

4. An increase in the amount of cooking water from the minimum for each vegetable caused a very marked and consistent decrease in the amount of thiamin retained in each vegetable, and an increase in the amount dissolved in the cooking water. By doubling the amount of water in cooking beets the retention of thiamin was decreased from 78 per cent to 53 per cent, and the solution of thiamin was increased from 20 per cent to 57 per cent. By increasing the amount of water in cooking cabbage from 400 gm. to 700 gm., the retention of thiamin was decreased from 85 per cent to 52 per cent. By increasing the amount of water in cooking potatoes from 200 gm. to 300 gm., and then to 550 gm., the retention of thiamin was decreased from 104 per cent to 75 per cent and 47 per cent respectively, and the solution to the cooking water was increased from 22 per cent with 300 gm. of water to 50 per cent with 550 gm. of water. By increasing the amount of water from 300 gm. to 550 gm. in cooking rutabagas the retention of thiamin was decreased from 86 per cent to 52 per cent and the percentage solution was increased from less than 14 to 41 per cent. There was no destruction of thiamin in any case as the changes were within experimental error.

5. The uncooked, dehydrated cabbage contained about 4 gm. of ascorbic acid per gm. on the dry basis.

6. Increasing the initial temperature of the cooking water for the unblanched, dehydrated cabbage from 20° to 98° C. caused an increase in the retention of ascorbic acid in the cabbage from 28 per cent to 71 per cent, and a decrease in the destruction of ascorbic acid from 60 per cent to 11 per cent.

7. When the cabbage was cooked without refreshing, after 30 minutes of refreshing and after 60 minutes of refreshing, the retention of ascorbic acid in the cabbage was 28 per cent, 19 per cent, and 7 per cent, respectively; the destruction was 60 per cent, 78 per cent, and 90 per cent, respectively, and the solution was 12 per cent, 6 per cent, and 3 per cent, respectively.

8. When the amount of cooking water for cabbage was increased from 400 gm. to 700 gm. the retention of ascorbic acid in the cabbage was decreased from 71 per cent to 47 per cent. The solution was increased from 18 per cent to 42 per cent, and the destruction, 11 per cent, was the same.

9. When the amount of cooking water for rutabagas was increased from 400 gm. to 700

gm. the retention of carotene was decreased from 98 per cent to 79 per cent.

10. When steamed in quantity, commercially dehydrated beets, cabbage, potatoes, and rutabagas retained 82 per cent of their thiamin, 88 per cent, 87 per cent, and 74 per cent, respectively. The remainder of the thiamin was found in the small amount of cooking water present. At the end of the "holding" period this water was absorbed by the vegetables.

11. When steamed in quantity, commercially dehydrated beets, cabbage, potatoes, and rutabagas contained 0.34 μ g. of thiamin per gm., 0.64 μ g., 0.79 μ g., and 0.68 μ g., respectively. For beets and cabbage the amount is about the same as when they were placed in a small amount of boiling water and cooked without refreshing.

12. The steamed vegetables lost no appreciable amount of thiamin upon being held in a warming oven for 1 hour. Practically all of the cooking water was absorbed.

13. Steaming was a very satisfactory method for quantity cooking of dehydrated beets and potatoes from the palatability standpoint. It was not satisfactory for the so-called strong juiced vegetables, cabbage, and rutabagas.

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Epidemiology of Plague in Ecuador*

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BUBONIC plague made its entry into Ecuador through the port of Guayaquil in 1908, the official announcement of its presence being made March 7. Eskey and Miño believe that the infection came from some Peruvian port, but Long suggests, as in the case of Antofagasta, that it may have originated in plague fleas brought from India in cargoes of jute bags.

From 1908 to 1930, plague appeared annually, from December to May, that is, during the warm, rainy season known locally as winter. A total of around 8,000 cases was reported in Guayaquil for this period. The characteristics noted included (1) a cyclic recrudescence of the infection; that is, years of severe epidemics, followed by years of lesser epidemics; (2) a progressive decrease in the number of cases in each 5 year period (1908-1912, 42 per cent; 1913-1917, 35 per cent; 1918-1922, 12 per cent; 1923-1927, 8 per cent; 1928 to 1930, when the disease was eradicated, 3 per cent); and (3) a decrease in the virulence of the germ or an increase in the resistance or partial immunity of rodents, as shown by a greater number of murine cases of plague without visible (latent or bacteriologic) lesions, but which could be identified by inoculation into guinea pigs.

In 1935, Guayaquil was reinfected from the *hinterland*, and the new epi-

demic lasted until April, 1939. From Guayaquil the disease spread by river or maritime traffic to other Provinces of the Coast, and by land to the Sierra or Inter-Andean region.

Of the coastal Provinces, Guayas had 7,863 cases with 3,113 deaths in Guayaquil, and 321 C and 141 D cases in the other 20 infected towns; El Oro Province reported 45 C and 21 D cases in 5 localities between 1909 and 1940; the Province of Los Rios, 50 C and 19 D cases in 3 localities, 1909-1936; and Manabi, 397 C and 109 D cases in 14 localities from 1913 to 1937. It is probable that there were some 8,800 cases, 3,500 deaths in the whole group of Ecuadorian coastal Provinces from 1908 to 1939.

Official reporting was more deficient in the Inter-Andean Provinces, but the accepted figure is a total of some 2,250 cases and 1,000 deaths. The official number of known cases was 1,215, with 585 deaths, in 131 hamlets and cities of Chimborazo Province; 171 C and 66 D cases for Tungurahua; and 68 C and 33 D cases for two towns in the Province of León.

In the Southern Zone, the infection which began about 1918 persists to the present day. There were 45 known C and 31 D cases for the Province of Cañar, and 1,404 C and 811 D cases for that of Loja (1925-1940).

INTER-ANDEAN PLAGUE

Plague spread from Guayaquil to the Andean Sierra by the Guayaquil-to-

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Quito Railroad, which rises from sea level to 11,890 feet (3,609 meters, Urbina Station), to descend at its terminal (Quito) to 9,350 feet (2,778 meters). The total distance involved is about 288 miles (452 km.) and Huigra, the first mountain station, at an altitude of 3,900 feet (1,245 meters), is only about 110 miles (116 km.) from Guayaquil.

In its first period, beginning about 1909, plague invaded the railway stations through the transportation of rats and *X. chcopis* infected in Guayaquil. There were 915 C and 450 D cases in a dozen places on the railroad, the most serious epidemics being those in Alausi, 1916, 167 C and 106 D cases; Ambato, 1916, 42 C and 18 D cases, 1926, 101 C and 36 D cases; Sibambe, 1936, 96 C and 75 D cases; and Guaytacama, 1927, 53 C and 25 D cases. During this first period the epidemiology conformed to the rat-flea, rat-man type of contagion, with the exception of a notable incidence of pneumonic plague.

During the second period plague spread from the railway communities to the rural areas, and after a short time of dependence on railway plague, the rural infection became independent, with its own local epidemiological characteristics.

In general, rural Andean plague manifests itself as an apparently discrete enzootic, this aspect being principally because of the low density of the rural population. It tends generally to have a seasonal distribution (during winter) although less so than along the coastal zone.

In the Andean zone the only province capable of maintaining plague infection is that of Chimborazo, and in that province, only the river basins. This may be because of a temperature and humidity favorable to flea activity, at least during the winter season.

These valleys are essentially agricultural, devoted to the growth of

grains, fruit, potatoes, and other products of the temperate zone. The inhabitants, mostly Indians, live in either isolated huts, or grouped in small hamlets, devoid of all comforts and hygiene. Among the factors influencing the occurrence of plague, may be mentioned those of agricultural-economic origin, such as type of farming (grain), dwelling construction (stone, clay, straw); those of climatic and topographical origin (rain in relation to agriculture, average humidity and temperature, altitude, etc.); those depending on social habits (promiscuity, dwelling, wakes, lack of change of clothing, drunkenness, etc.); and those of biologic origin (rats, fleas, guinea pigs, etc.).

BIOLOGICAL FACTORS

Rodents.—Various authors have accepted the statement that in general domestic rats are scarce in the Sierra, where they were introduced by the Guayaquil-Quito Railroad since 1908. This statement has not been confirmed, but instead domestic species, especially *R. rattus* and *R. alexandrinus*, have been found to be universally distributed. In towns on the railway line a high percentage of *R. norvegicus* is not uncommon (Latacunga 60 per cent; Ambato 10 per cent; Huigra 5 per cent; Quito 50 per cent). In the Loja area rats are fundamentally field-dwelling, and are not common in the cities. The percentage which rats form of the total of rats and mice (*M. musculus*) varies in different localities. In the province of Chimborazo in general this percentage is 50; and for certain cities: Latacunga, 93 per cent; Ambato, 88 per cent; Riobamba, 32 per cent; Cañar, 80 per cent; and Loja, 7 per cent.

While local authors accept the fact that plague is related to rats in Guayaquil and in the railway stations on the road to Quito, they do not agree that

this mechanism is the most usual in the rural Andean zone.

Among the wild rodents which must be mentioned as of possible importance in plague are *Phyllotis fruticulus*, *Oryctolagus* sp and, especially, *Cavia aperea*, the last of which is found principally in a domesticated state in close contact with the Indian population, which uses it as the principal source of meat.

Other animals—In Loja is found the weasel and in the inter-Andean region, the *zorra o raposa* (*Didelphis paraguayensis andina*), the susceptibility of which to experimental plague has been verified by the author. The *chucuri*, long-tailed *mustela*, or bridled mustela (*Mustela frenata aureoventris*) is important as a natural enemy of rats and because of the possibility that *X. cheopis* might accidentally be found on it. Squirrels of the Loja zone do not appear to play a part in plague.

Fleas—The following fleas have been found by previous authors on rodents, guinea pigs, and man: *X. cheopis*; *P. irritans*; *C. londinensis*; *Ct. canis*; *Ct. felis*; *Echidnophaga galinacea*; *Hectopsylla suarezi*; *Leptopsylla musculi*; *Rhopalopsyllus cavicola* and *Tunga penetrans*.

In addition, the author has found on rats of the Loja zone, *Craneopsylla wolffhuegeli* and two species as yet unclassified; on rabbits, *Cediopsylla inequalis*; and on *Didelphis* and *mustelae*, various species at present undergoing classification.

Flea indexes—In Guayaquil *X. cheopis* is practically the only murine flea. In 1926 the *cheopis* index was 3.36 (Suarez). In 1941 it fluctuated below 1.

In the Sierra in 1926 the average *cheopis* index on *R. norvegicus* was 0.94 and on *R. rattus* and *R. alexandrinus* 1.27 (Suarez). In 1929–1930 the *cheopis* indexes were: Ambato 3.69; Alausi 0.87; Latacunga 0.96; Quito

0.3; and 0.0 in Guamote, Riobamba and Guaytacama. In 1942 *cheopis* fleas were found in Huigra, Yalancay, Gausuntos, Ceceles and Riobamba; this flea had not previously been reported in the last named city.

Lice and acari—The following have been found on rats: *P. spinulosum*, *L. echidninus* and *L. bacoti*; and on guinea pigs *Gyropus* sp.

DYNAMICS OF PLAGUE

We have seen that plague in Guayaquil and the railroad communities of the Andean region depended on plague-infected rats and fleas. Local authors maintain the thesis that in the rural Andean region plague does not involve the intervention of rats and rat fleas, but rather that of guinea pigs, which they consider reservoirs of the infection. Since *R. cavicola* of the guinea pig has not been recognized as a vector of plague from the guinea pig to man, and since as it has been stated, plague in guinea pig always precedes human cases, it has been supposed, without direct evidence, that the plague vector from the guinea pig to man is *P. irritans*. This, furthermore, could maintain man-to-man infection, favored by the custom of holding wakes and of distributing the clothing of the plague dead among the relatives.

A detailed study undertaken in 1940 and 1941, with regard to human fleas and fleas of domesticated guinea pigs, revealed that in 1940, of 6,143 fleas collected from humans, beds, clothing, etc., only 122 (1.67 per cent) were not *P. irritans*; 103 of these were *R. cavicola*, which came from only 2 of 54 localities studied. In 1941, of 7,225 fleas of similar origin, only 130 (1.6 per cent) were not *P. irritans*, 102 of these being *R. cavicola*.

In 76 localities in 1940, 10,116 fleas were caught on guinea pigs, including 8,309 *R. cavicola*; 718 *P. irritans*; 68 *C. londinensis*, and 991 unclassified. In

27 localities only *R. cavicola* were found.

In 1941, in 43 localities, 5,696 fleas from guinea pigs were classified. *P. irritans* were scarcely 0.53 per cent of the total (in place of 7 per cent in 1940), and in 37 localities the guinea pigs did not have any *P. irritans*. Since the study was made in the second half of 1940 and the first half of 1941, the difference might be explained by seasonal conditions and "hibernation" of *P. irritans* in guinea pigs.

From the previous data it may be gathered that *P. irritans* does not satisfactorily explain the distribution of Andean plague. Nor is it possible to attribute to it a very important epidemiological rôle when it is considered that the human flea lacks significance in plague in other countries and its capacity as a vector is, experimentally considered, limited. The author cannot accept the local theories crediting importance to this and other fleas habitually found on rats and guinea pigs. He feels that the Andean zone should be divided in two sectors with regard to the vector: first, that including up to 8,900 to 9,900 feet (2,700 to 3,000 meters) altitude, with a humidity and temperature adequate, at least seasonally, to the breeding of *X. cheopis*; and second, cold regions located above 8,800 feet, and in general all areas of an altitude above 9,900 feet in which *X. cheopis* can neither live nor breed in case they should reach them accidentally.

In the localities of the first Andean sector, plague epidemiology shows the classic form observed in rural areas; that is, epizootic transmission from rat to rat by *X. cheopis* and human "accidents" more or less epidemic in character, involving the intervention of the same flea.

In the more elevated regions, where *X. cheopis* is absent, *C. londinensis* may play an important rôle, in view of its

biologic characteristics and its preference for rat nests. In considering the lesser capacity of this flea to become infectious and to transmit plague, as contrasted with *X. cheopis*, it should be explained that plague in the high altitudes of the Andes rarely reaches man, having a sporadic character with the occurrence of a few, strictly familial, cases.

In view of the common observation of the participation of the guinea pig in plague, one might well attribute a preponderant rôle to this animal as a reservoir of the infection. However, the author does not accept anything but an accidental participation of guinea pigs in plague.

The guinea pig does not explain the origin of Andean plague, since its capacity as a reservoir is doubtful in view of its enormous susceptibility. Its correlation with plague is not perfect, and it appears rather to act as a reinforcing factor in the infection, serving as an intermediary of plague between rats and man by the liberation, at its death, of the infected fleas which it has previously caught at soil level.

Since the guinea pig is a co-dweller in the human habitation of the Sierra, it is easy to suppose that, acting as a "flea-trap," it continually collects free fleas found on the ground level. In the climatic conditions of the Sierra, the majority of contacts between rats and fleas take place in the burrows, since the range of the exterior meteorologic conditions is unfavorable to the flea and impedes the free circulation of this insect in the out-of-doors.

Most of the plague phenomena occur, therefore, in the interior of the caves, and the plague infected fleas only abandon these burrows when the external atmospheric conditions become more favorable and when the subterranean epizootic has done away with the rat population in the nests. It is logical that under these circumstances,

the first recipient of the plague infection carried by such fleas, should be the guinea pigs which run freely above ground, and that these infected fleas should only reach man after having caused an epizootic in, and death of the guinea pigs.

A series of factors, principally climatic and agricultural in origin, govern this epidemiology by favoring murine migrations from house to field and vice versa. On the other hand, the number of immune rats remaining after an epizootic episode, and the number of susceptible animals added to the rat population through migration or natural increase, are important factors in the epidemiology of murine plague. It is possible that the most important reservoir of plague in the Ecuadorian Sierra may be the fleas themselves, which remain infected from one plague season to another, and through which the infection is revived when, after the harvest, a new population of susceptible rats returns to the dwellings, which happens just at the season of the year climatically most favorable to the transmission of plague from fleas to rats.

The study on which these observations are founded, included numerous other epidemiologic details which permit an explanation of the mechanism of plague in the inter-Andean zone on a

basis which agrees better with the facts than theories previously advanced.

SUMMARY

Rural plague of the inter-Andean region conforms to the classic rat-flea mechanism, with changes imposed by the climatic characteristics under which the biologic activities of the rats and fleas are conducted. All the other phenomena foreign to this rat-flea mechanism should be considered simply accidental manifestations without any fundamental influence on it. However, such phenomena may on occasions appear to be predominant because they are the features most easily detected in the usual epidemiologic survey.

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Endemic Typhus Fever in Jamaica, B. W. I.

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IN spite of the fact that it is generally believed that endemic typhus fever is a common disease in the West Indies, there are few reports to substantiate this view. In fact, Zinsser¹ in a comprehensive survey of typhus fever does not indicate its presence in the Caribbean area up to 1937. The *Epidemiological Report of the League of Nations*, 1936² does not record the presence of typhus fever in Jamaica, nor do the careful records of the hospitals of the United Fruit Co. indicate its presence. Typhus fever was not noted in the records of the United Fruit Co. for two successive years in Costa Rica, Cuba, and Jamaica, although the records covered the case histories of 47,000 in-patients and a half million out-patients. The health authorities in Jamaica state that typhus had not been recorded in Jamaica prior to 1941, when the cases comprising this report were noted.

The occurrence of typhus in Puerto Rico has been reported by Pons³ who records 8 cases presenting typical clinical symptoms of endemic typhus with a positive Weil-Felix agglutination (OX₁₉). In a later paper⁴ this author

substantiated his previous findings by reporting a rise in agglutination titer (OX₁₉) in 20 additional cases. The author's conclusion that typhus fever was present is justified even though the agent was not isolated. These and some additional Puerto Rico cases since have been tabulated in the *Public Health Reports*, and 2 cases have been diagnosed as endemic typhus in our laboratory by the complement-fixation test.

In 1937, the first case of endemic typhus was reported from Martinique.⁵ The illness was characterized by an acute onset with headache, continued fever, and a rash. The Weil-Felix agglutination (OX₁₉) titer rose from 1:300 to 1:1,000. No agent was isolated.

The present report deals with the occurrence of endemic typhus in Jamaica in 1941 and 1942. In a period of 5 months, 68 probable cases were diagnosed in natives.

The first case of typhus occurred in a native Jamaican laborer in December, 1941, the diagnosis being made by Captain T. E. Woodward. This man

complained of fever, headache, and generalized pains, and was admitted to the Army Hospital. The patient appeared moderately toxic and, outside of conjunctival injection and a few rales at the bases of the lungs, nothing abnormal was found. The temperature ranged from 100 to 105° for 14 days and fell by lysis. In spite of careful search, no rash was observed. This native had a cafe-au-lait colored skin, and a slight rash may have been missed. The Weil-Felix agglutination (OX₁₉) was 1:500 on the 8th day of illness, 1:1,000 on the 9th day, and 1:2,500 on the 12th day. Complement-fixation tests performed on specimens of serum withdrawn on the 8th and 12th day indicated that the patient's infection was of the endemic type of typhus.⁷

This case directed attention to the likely presence of murine typhus on the Island which in due time was confirmed.

In all, 68 cases were found in whom a diagnosis of endemic typhus was made, chiefly in native residents of Kingston. Most of the cases came from the thickly populated, poorer sections of the city where rats are common. Thirty-three of these cases were seen in the hospitals in Kingston. The prevailing symptoms are indicated in Table 1. The onset is usually sudden with severe headache, generalized pains, and temperature which is maintained for about 14 days when it falls by rapid lysis. Rash was only seen in 7 cases. In these cases the rash was maculopapular in character appearing on the body, arms, and legs, and was typical in character. No rash was observed in 26 cases but may have been masked in some instances by the dark skin of the natives. However, some cases, which were carefully observed, showed no rash, and hence the possibility of typhus occurring without an eruption must be considered.

All of the cases had a Weil-Felix

TABLE 1

Summary of Symptoms of 33 Cases

| Symptoms | Number | Per cent |
|----------------------------|--------|----------|
| Positive Weil-Felix | 33 | 100 |
| Positive Comp. Fix. Typhus | 33 | 100 |
| Headache | 25 | 76 |
| Backache | 16 | 48 |
| Arthralgia | 16 | 48 |
| Diarrhea | 9 | 27 |
| Chills | 8 | 24 |
| Nausea Abd. pain | 8 | 24 |
| Rash | 7 | 21 |

(OX₁₉) agglutination, ranging from 1:500 to 1:5,000, in most of whom a rising agglutination titer was observed. Specimens of serum examined for complement fixing antibodies were positive at least late in all cases. In some instances a negative fixation was obtained early in the disease which became positive subsequently. In the sera of most patients, complement fixing antibodies were present which reacted with an endemic rickettsial antigen but not with an epidemic rickettsial antigen. In a few cases, convalescent sera had relatively large amounts of complement fixing antibody against an endemic antigen and small amounts against an epidemic antigen.⁷

The 35 remaining cases were seen by local physicians. The diagnoses in these cases were made by the history of the case, a positive Wei-Felix agglutination, and in all instances a positive complement-fixation reaction for endemic typhus.

Attempt was made to isolate virus from a few cases but these were unsuccessful. In addition, ectoparasites of rats trapped in homes in which certain of these cases occurred, were injected into guinea pigs, but no agent was isolated. Two of these guinea pigs, receiving respectively, 13 fleas (*Xenopsylla cheopis*), and a pool of 7 fleas, 2 sucking lice (*Polyplax spinulosus*) and 5 tropical rat mites (*Lyponysus bacoti*), showed sporadic, low fevers, and later resisted controlled challenge doses of endemic typhus

virus (Wilmington strain). This suggests that the ectoparasites in these tests probably carried the agent.

The evidence presented here indicates that endemic typhus fever exists in Kingston, Jamaica. The fact that 68 probable cases were found in a period of 5 months suggests that the disease is more common in Jamaica than was formerly believed. The clinical and serological evidence indicates that the outbreak was endemic typhus even though the etiological agent was not isolated.

NOTE: The authors wish to thank Major Hallinan, Chief Medical Officer, Jamaica, and his staff for their coöperation, as well as Lt.

K. Wertman for his assistance in performing the complement-fixation tests.

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Rapid Detection of the Production of Acetyl-Methyl-Carbinol*

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THE Voges-Proskauer test is one of the most important means of differentiating between strains of the genera *Escherichia* and *Aerobacter*. Various workers have recommended incubation periods of anywhere from 5 days down to 6 hours at 30° C. or 37° C. It is not within the scope of this brief paper to go into a detailed discussion of the V.-P. test. If demonstration of the production or non-production of acetoin could be encompassed within an ordinary laboratory working day (8 hours) such a procedure would be advantageous to laboratory workers.

There are several recent modifications of the V.-P. test. Werkman (1930)⁴ suggested 4 days' incubation at 30° C. and the use of FeCl₃ as a catalyst. To 5 ml. of culture he added 2 drops of 2 per cent solution of ferric chloride then 5 ml. of a 10 per cent NaOH solution. (The ferric chloride should be added before the alkali to prevent marked flocculation.) A positive test is indicated by a deep copper coloration beginning at the surface and after a few minutes extending throughout the medium.

O'Meara (1931) suggested the following medium to be used for the Voges-Proskauer test:

| | |
|---|---------|
| Sodium chloride | 5.0 gm. |
| Magnesium sulphate | 0.2 gm. |
| (NH ₄) H ₂ PO ₄ | 1.0 gm. |

* The work herein described was made possible through funds of the Engineering Experiment Station, Iowa State College, Ames, Iowa.

| | |
|---------------------------------------|-------------|
| K ₂ HPO ₄ | 1.0 gm. |
| Sodium citrate | 2.77 gm. |
| Glucose | 5.0 gm. |
| Sodium fumarate | 10.0 gm. |
| Distilled water to..... | 1,000.0 ml. |

He suggested the addition of about 0.25 gm. of creatine to 5 ml. of culture (grown at 37° C. for 24 hours) followed by 5 ml. of 40 per cent KOH. With O'Meara's technic³ the red coloration of a positive V.-P. test appears in several minutes and increases with agitation of the tube contents.

Levine, Epstein, and Vaughn (1934)² combined the reagents (40 per cent KOH and creatine) suggested by O'Meara into a single solution consisting of 40 per cent KOH plus 0.3 per cent creatine. Their technic was as follows:

A small loopful (1½ mm. diameter) of a young agar slant culture was introduced into about 3 ml. of Difco M.R.- V.-P. medium, the mixture incubated at 30° C. for 6 to 7 hours, after which the creatine-alkali test reagent was added.

Readings were taken after 1, 2, and 4 hours. The authors tabulated their results as follows:

TABLE IV *
Voges-Proskauer Reaction on 202 *Aerobacter*
Strains Employing 6 and 7 Hour
Cultures at 30° C.

| Time Elapsed After | | Positive Reaction | |
|-----------------------------|-------------|-------------------|----------|
| Addition of Test Reagent | Inoculation | Number | Per cent |
| 1 Hour | 7-8 Hours | 157 | 77.8 |
| 2 Hours | 8-9 Hours | 195 | 96.5 |
| 4 Hours | 10-11 Hours | 202 | 100.0 |

* From Levine, et al. (1934)

It is evident from the table presented that with the technic of Levine, Epstein, and Vaughn, the time required for the completion of the V.-P. test may be reduced to a maximum of 11 hours.

Barritt (1936)¹ made no attempt to reduce the time required for the V.-P. test but tried by the use of alpha naphthol to make the test more sensitive. Barritt's technic is stated by himself as follows. "I have therefore employed cultures in 6 x 5/8 in. tubes of glucose phosphate broth (Ministry of Health, 1934) made with Difco bacto-peptone, which appears to be suitable for this test. After 3 days' incubation at 37° C. 1 cc. of culture was placed in a 6 x 3/4 in. test tube, to which were added 0.6 cc. of a-naphthol (5 per cent alcoholic solution), and 0.2 cc. of KOH (40 per cent solution). Equally good results were obtainable with 0.5 cc. of a 6 per cent solution of a-naphthol and 0.5 cc. of a 16 per cent solution of KOH." Using the foregoing technic Barritt obtained positive reactions in 2-5 minutes after the addition of the reagent.

The study herein presented was undertaken with two objectives in mind, namely: (1) to ascertain if production of acetoin (V.-P. test) could be detected within 8 hours, (2) the effect of temperature (30° C. and 37° C.) of incubation on the proportion of positive V.-P. tests.

In the experiments to be described, 216 known strains of V.-P. positive organisms were used. The following technic was employed.

A massive inoculum consisting of a loopful (2-3 mm.) of a 12 hour nutrient agar slant culture was introduced into 2 ml. of Difco M. R.-V.-P. medium (contained in 18 mm. tubes). The tubes were incubated at 30° C. for 6 hours and then 0.6 ml. of a-naphthol (5 gm. of a-naphthol in 100 ml. of 95 per cent ethyl alcohol) added, followed by 0.2 ml. of 40 per cent KOH to which had been added 0.3 per cent

creatine. The tubes were then shaken vigorously for 30 seconds to 1 minute.

The foregoing experiment was repeated using 37° C. as the incubation temperature.

The results of both of the above experiments are presented in Table 1. A positive reaction was characterized by an intense pink to rose coloration developing in a few seconds to 5 to 10 minutes after the reagents were added. In both experiments 10 strains of *Escherichia coli* were used and were found to be negative.

TABLE 1
Voges-Proskauer Reaction of 216 Strains of the Genus Aerobacter Employing 6 Hour Cultures at 30° C. and 37° C.

| Minutes After Addition of Reagent | Incubation Temperature | | | |
|--|------------------------|--------|----------|--------|
| | 30° C. | | 37° C. | |
| | No. Pos. | % Pos. | No. Pos. | % Pos. |
| 10 | 215 | 99.5 | | |
| 30 | 215 | 99.5 | 190 | 87.7 |
| 60 | 215 | 99.5 | 198 | 91.7 |
| 120 | 215 | 99.5 | 200 | 92.6 |
| 400 | 215 | 99.5 | 200 | 92.6 |

From Table 1 it will be noted that at 30° C. 215 of the 216 *Aerobacter* strains gave a positive reaction within 10 minutes after the addition of the reagents. Thus, at 30° C., the total time consumed in the test, from the time of inoculation to the appearance of a positive test, was less than 6 hours and 15 minutes. In marked contrast, it is noted that at 37° C., 30 minutes after the addition of reagents, only 190 (87.7 per cent) of the cultures were positive and, even after 400 minutes, only 200 (92.6 per cent) positive reactions were obtained.

From the data herein presented, it may be concluded:

1. With the technic herein described, detection of a positive V.-P. test may be consummated in less than 7 hours.

2. An incubation temperature of 30° C. is preferable to 37° C. for the detection of the

maximum number of positive Voges-Proskauer tests.

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The Danger of Botulism

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ALTHOUGH the high fatality rate of botulism makes it a spectacular disease, botulism has never been regarded as a major health problem. A recent tabulation¹ shows, however, that during the period 1899 to 1941, as many as 359 outbreaks with 1,024 cases and 669 deaths were recorded in the United States and Canada. Many of these outbreaks occurred in the western states, particularly in the Rocky Mountain Region where the present writer and his associates reviewed and reported as many as 32 human outbreaks with 107 cases and 83 deaths, as well as several outbreaks involving burros, poultry, and mink.²⁻⁵

Most of these outbreaks were caused by eating improperly home-canned vegetables, and in view of the current shortage of food in this country and the consequent plans of many housewives to can as much food as possible this year, a timely warning may help to prevent a recurrence of the catastrophic outbreaks of botulism which followed the widespread use of the "cold-pack" method of home-canning during the first World War.^{6, 7}

The first principle in the control of botulism is governmental regulation and inspection of commercial processing of all preserved food.⁸ As a result of several devastating outbreaks of botulism caused by eating commercially canned ripe olives, this principle reached its highest development in California⁹ but has been so widely adopted that very few outbreaks of botulism have been ascribed to commercially canned foods in recent years. We are therefore

mainly concerned with the problem of home-canning.

This is primarily a problem in public education of housewives and others engaged in canning and serving foods. To undertake such education is a worthwhile effort in every community; it should be done under the auspices of every health department as a means of conserving food which would otherwise be wasted, at the same time avoiding the danger of food poisoning.

There are many women in this country who are well grounded in the fundamental principles of bacteriology as applied to home-canning, who intelligently and successfully, year after year, use controlled steam-pressure or intermittent methods of sterilization in canning, who are ever conscious of the danger of botulism in spoiled canned foods, who never taste or serve spoiled food, and who always re-cook canned foods before serving them. Deaths from botulism seldom occur among these housewives and their families. Such women in every community would make excellent instructors for groups interested in the art of home-canning.

There is also, unfortunately, a very large group of women who have little or no knowledge of bacteriology, who use antiquated "cold-pack" or other inadequate rule-of-thumb methods of canning, and who, having much spoilage, are vaguely conscious of an ill-defined element of danger which they attempt to avoid by tasting each jar of food before serving it. No doubt thousands of jars of harmlessly spoiled home-canned foods are discarded as a

result of this common practice, but, from time to time, a jar is encountered which contains botulinus toxin, resulting in the death of the "human guinea-pig" and often domestic fowls and other animals as well, though in these instances the other members of the family may not suffer. This is an important and relatively easy group to reach.

Finally, there is a group of people who are at the bottom of the ladder, educationally, socially, and economically, who use the crudest methods of home-canning, who are apparently oblivious to the danger of eating spoiled food and will eat anything out of a jar or can that looks like food and doesn't taste too bad. In some instances canned foods fermented by *Bacillus botulinus* have been especially relished for their exotic flavor or they may have been highly seasoned to mask spoilage. When botulism occurs under these conditions it usually takes a dramatic toll. This group is naturally the hardest to reach because aggressive personal instruction is required, but the effort is likely to pay good dividends.

It is not the purpose of this article to go into detail on the subject matter of such instruction, or to discuss the relative merits of the various methods now being advocated in farmer's bulletins.¹⁰

It is recognized that while the pressure-cooker, properly operated, provides the easiest and best method of home-canning there is likely to be a shortage of such cookers. Correct operation should be emphasized; we have recorded three outbreaks of botulism caused by foods supposed to have been sterilized in pressure-cookers.

Emphasis should undoubtedly be placed upon the following items:

1. Processes:

- a. Careful selection of sound produce.
- b. Careful cleansing, and when indicated, blanching, of produce, as well as general

cleanliness to minimize the bacterial load to be sterilized.

- c. Principles and correct application of intermittent sterilization, as a valuable and available substitute for cooking under steam-pressure.
- d. Use of other methods of preserving food, notably drying, salting, and pickling in which there is little or no danger from botulism.

2. Consumption of home-canned foods:

- a. Significance of turbidity, gas-production, softening and odor as criteria of spoilage.
- b. Danger of eating or even tasting freshly opened home-canned foods, especially if signs of spoilage are present.
- c. Fact that certain foods, notably beets, chili, sometimes beans, and possibly other foods, may show no easily recognizable signs of spoilage even though botulinus toxin is present.
- d. Destruction of botulinus toxin by always boiling home-canned foods for at least 5 minutes before serving.
- e. Harmlessness of the spores of *Bacillus botulinus*.

3. Safe methods of disposal of contaminated foods by boiling in strong lye-water to avoid:

- a. Killing poultry and other domestic animals.
- b. Excessive pollution of the soil with the spores of *Bacillus botulinus*.
- c. Loss of usable containers.

4. In case an outbreak occurs:

- a. Character of symptoms of botulism and other forms of food poisoning.
- b. Prompt reporting of suspicious symptoms to physicians.
- c. Diagnostic value of symptoms in fowls and other domestic animals in case humans have tasted same food.
- d. Inadequacy of botulinus antitoxin for treatment of advanced botulism.
- e. Saving of remnants of food for epidemiological and laboratory studies of food-poisoning.

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California Adopts Revised Regulations Regarding Infant Diarrhea

Wilton L. Halverson, M.D., Dr.P.H., California Director of Public Health, has announced that the California State Board of Health has recently revised its definitions as to what constitutes a reportable case of diarrhea of the newborn, defining the disease as diarrhea in infants up to 3 weeks of age occurring in a hospital giving maternity service. Diarrhea shall be considered to exist when an infant has four or more loose stools in 24 hours, except in the case of entirely breast fed infants who show no other signs of illness and who are

gaining weight. Strict regulations are prescribed for the isolation of infected infants and their contacts.

J. C. Geiger, M.D., Director of the Department of Public Health, City and County of San Francisco, reports an elevated rate of infant mortality for the first 4 months of 1943 and directs attention to the new requirements relating to deaths from diarrhea in infants. The infant mortality rate for this period in 1943 is 45.8, whereas for the corresponding period in 1942 it was 38.0.

Gearing Dental Public Health to Meet Wartime Conditions

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THE new socio-economic conditions created by the war have changed the dental public health picture to such an extent that traditional approaches to the problem are no longer satisfactory. A rapid summary of the situation shows:

There is a job for everyone who will work. Relief rolls are reduced to only those who are unemployable.

So-called medical indigents are fewer than ever before.

Retired individuals, and women who formerly did not seek or need employment, are now working in offices, factories, and hospitals as a patriotic duty and not particularly for personal gain.

Workers in factories which have no dental provision in their respective industrial hygiene programs frequently find that appointments with the family dentist, if they can get to him, are very hard to obtain, if at all.

Reports from several factories have indicated that more time is lost on account of the lack of dental care than for any other reason. In certain areas workers sit in dental offices hoping that some person having an appointment will not keep it.

The armed forces, when commissioning dentists in the Reserve Corps during peacetime, were not concerned with the location of the men who were placed on their rolls. This is as it should be. Subsequent to the declaration of war, demands for dentists caused men to volunteer, and leave vital and poorly supplied areas. The draft and the activities of recruiting boards took others. While these events served

military purposes, the distribution of dentists remaining in the population was not taken into account. Naturally there has been a decrease in dental services in many communities and a depletion in others.

The need of the armed forces for professional personnel has also created another unique situation. People and communities having financial resources have been reduced to the status of medical and dental indigents because they are unable to obtain services. In addition, new industrial areas have created community and health needs in places where no facilities previously existed.

We are told that very soon more than 50 per cent of production will be for war purposes. Increased production has increased the purchasing power of many people. Even though taxation will reduce the cash incomes to some extent, it is expected that a restriction of purchasable commodities will leave a large proportion of the incomes to be spent for personal services. This fact, coupled with the increase in employment, is creating a demand for long neglected dental services. This means that the established practitioners have less rather than more time to devote to problems arising on account of the shortage of dentists.

A lowered standard of nutrition is a future possibility. The rationing of

sugar is looked upon by most of the dental profession as highly desirable, since the relationship of carbohydrate consumption to dental caries has been shown to exist. On the other hand, the absence of certain food constituents may cause a higher incidence of some diseases. Reports from England already indicate that there is a rise in the incidence of Vincent's infection. The newer forms of treatment used in Britain to control Vincent's infection include the use of certain food constituents.

Conventional dental practice has been established on the basis that if a given community could support a dentist, one would move into the area. It then followed that the needs of all the people within twenty or thirty miles would thus be met. Gasoline and tire rationing, coupled with higher incomes, now creates a problem never before visualized. Restricted civilian travel indicates that serious problems of distribution of services are ahead, not only in the newly constructed housing developments surrounding more populated areas, but in more rural areas as well. Programs utilizing centralized dental clinics are finding that the once helpful lay organizations no longer have the gasoline or tires to expend in transporting school children to the clinics.

Due to the lack of equipment and dental supplies, it is becoming increasingly difficult to purchase the necessary equipment for new offices or clinics. Existing clinics must, therefore, be operated more efficiently than ever, and the equipment of dentists who have gone into the armed services must be redistributed.

It must be admitted that even in peacetime the public as a whole has not received adequate dental care; in fact, only a small proportion has been economically able to obtain even the approach to ideal services. In wartime the construction of highly refined and

time consuming precision appliances in dentistry should give way to basic routine treatment which will render the maximum amount of health services to the largest number of people. One may assume that much could be accomplished in this direction through voluntary effort.

The dental caries problem is different from other health problems. Nearly the whole population suffers from this disease. Dental studies show that after 6 years of age permanent teeth are attacked at the rate of $\frac{3}{4}$ of a tooth per child per year. The annual incidence of new defects, added to those already accumulated, presents a health problem of the first magnitude. At the moment there are no proven measures to prevent the inception of dental caries. The only effective method we have of preventing the sequelae of dental caries (infections and loss of teeth) is by utilizing remedial measures. In other words, without considering other oral diseases, to control dental caries dental service is continuously needed by practically everyone.

The problem resolves itself then, to the basic question—How can civilian dental needs (general health conservation and care of specific dental diseases) be met under the conditions created by the war?

To deal effectively with the points raised, it is necessary that:

1. Dentists remaining in civil life be distributed in the population according to the most favorable ratio permissible.

2. Industrial and vital war areas be supplied with dental facilities in order that no person shall be absent from his job because of the lack of basic dental services. This applies to both the factories and the nearby housing developments.

3. The usual school dental service programs be extended to include services to high school pupils. The gap in services between elementary school children and those in high school should be closed as rapidly as possible. The man power to supply dental service to these categories may have to be assigned by

procurement agencies, if objectives cannot be attained by voluntary efforts.

4. Sub-professional personnel be utilized to the fullest possible extent.

5. In critical areas it may be wise to request that highly refined mechanical dental appliances and replacements be not constructed until some more opportune time, and thus permit a health service type of dentistry to be rendered to a large number of patients.

6. In extreme circumstances, a system of priority of patients, which will give first con-

sideration to the most productive members of the community, may be advisable.

State and local dental committees studying the problems of adequate dental care, in an attempt to foster the war effort by maintaining civilian health, would be extremely wise if they included on their committees representative individuals to act for the consumer groups—the general public.

Milk Laboratories in War Areas*

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LABORATORY methods for controlling the sanitary quality of market milk have been used in this country for about fifty years. Nearly forty years ago the first committee was appointed by the American Public Health Association to standardize such methods. Since then eight editions of *Standard Methods of Milk Analysis* have been published, and supposedly everyone in this country engaged in official analysis follows Standard Methods.

For years we have known that different laboratories fail to obtain the same result upon bacteriological analysis of the same milk supply, and much has been published on the inherent errors and inaccuracies of the methods. These differences assumed greater importance when recognition of the value of milk in nutrition resulted in its greater use by our increasing armed forces as well as by civilians, with consequent analysis of fluid milk by various official agencies.

In the interest of increasing the accuracy and dependability of bacteriological milk analysis, survey forms were prepared based upon Standard Methods (7th edition). These forms included one for the agar plate method, and one for the direct microscopic and methylene blue reduction methods.

Using these forms, surveys were made in defense areas, commencing in September, 1941. Laboratories doing

official analyses were visited and observations made of equipment, general preparation and sterilization of material, and the actual technic of making the analyses, reading the results and recording or reporting these. With the view of securing closer compliance with Standard Methods, correct procedures were demonstrated and suggested and a blank copy of the survey form was left as a guide. A checked copy of the form with written recommendations regarding the deviations in equipment and technic was submitted later to each laboratory concerned.

The survey forms were revised in January, 1942, based upon the experience with the first hundred laboratories surveyed in 20 states east of the Mississippi River. In order to avoid misunderstanding, a number of items were amplified, frequently after obtaining, directly from members of the Standard Methods Committee, an interpretation of exactly what was intended. A few inconsistencies and errors in Standard Methods were corrected, and a few items not specified in Standard Methods were included. The additional material not in Standard Methods, but found necessary by experience, was taken up previously with the referee of that section of Standard Methods and included other ways of obtaining the same result (such as maximum-minimum thermometer instead of thermometer in container of liquid) or actual listing of something assumed in Standard Methods (such as using a separate pipette

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 30, 1942.

for each sample, and for each dilution).

An additional form was also prepared on which certain miscellaneous information not required by Standard Methods could be recorded, such as space and facilities of the laboratory. This form also listed the requirements of Standard Methods on Sampling, and certain requirements of health department practice pertaining to milk analysis where communities operated under the *Milk Ordinance and Code* recommended by the U. S. Public Health Service.

While earlier surveys had included only the larger defense areas, after war

was declared an attempt was made to include all laboratories in each state doing official analyses, inasmuch as most places large enough to maintain a laboratory either were or would be war areas.

Of 281 laboratories making official bacteriological milk analyses in the 40 states (including the District of Columbia) surveyed to date, 276 used the agar plate method. Of these, 27 also used the direct microscopic examination, and 28 used the methylene blue reduction method for samples of producers' milk. In addition to these 276 labora-

TABLE 1

*Summary of Items Pertaining to Apparatus Used in Bacterial Plate Count
Indicating Lack of Conformity with Standard Methods for the
Examination of Dairy Products (8th Ed.)*

| Item | Total Laboratories 276 | DEV* | UND* | NOT* |
|---|------------------------|------|------|------|
| 4. <i>Pipettes</i> —A.P.H.A. specifications or accurately calibrated tips unbroken | 134 | 3 | ... | ... |
| stored and handled in suitable containers (paper allowed) | 14 | 3 | ... | ... |
| 5. <i>Dilution bottles</i> —preferably resistant glass | 5 | 3 | ... | ... |
| graduation marked indelibly | ... | 1 | ... | ... |
| solid stoppers or leak-proof closures | 123 | 9 | 5 | ... |
| 6. Petri dishes—100 mm. x 15 mm. | 49 | 7 | ... | ... |
| flat bottoms | 14 | ... | ... | ... |
| free from defects | ... | 2 | ... | ... |
| stored and handled in suitable containers (paper allowed) | 4 | 4 | ... | ... |
| 7. <i>Thermometers</i> —accuracy checked with thermometer conforming to specifications of National Bureau of Standards | 3 | 37 | ... | ... |
| 8. <i>Incubator</i> —water jacket filled or low temperature units or suitable area in constant temperature room within tolerance | 188 | 41 | ... | ... |
| shelves suitably spaced | 53 | 17 | ... | ... |
| temperature variations checked (with incubator filled) | ... | 4 | ... | ... |
| not less than 20" x 20" x 24" high (or equivalent space) | 121 | 40 | ... | ... |
| kept in room of suitable temperature | 70 | 4 | ... | ... |
| where room temperature is too high provide cooling | 0 | ... | ... | ... |
| 9a. <i>Media-making equipment</i> —glass or other suitable utensils (which will not contaminate with toxic materials such as copper, zinc, antimony, chromium, etc. | ... | ... | 276 | ... |
| 9b. <i>Hydrogen-ion</i> —accurate and reliable colorimetric standards or dependable electrometric equipment | 4 | 22 | ... | ... |
| 9c. <i>Melted agar</i> —(desirable) constant temperature water-bath or incubator at 45°–50° C. | 62 | 30 | ... | ... |
| 9d. <i>Counter</i> —uniform and properly controlled illumination (equivalent to Quebec counter) | 153 | 58 | ... | ... |
| magnification | 116 | 12 | ... | ... |
| ruled guide plate (rulings in squares preferred) | 23 | 7 | ... | ... |
| 9e. <i>Tally</i> —mechanical hand tally | 14 | 5 | ... | ... |
| 10. <i>Hot air oven</i> —suitable size | 116 | 2 | ... | ... |
| proper construction | 3 | 17 | 6 | ... |
| suitable vents | 1 | 8 | 6 | ... |
| temperature variations within oven checked | 4 | 6 | 6 | ... |
| equipped accurate thermometer | 214 | 24 | 6 | ... |
| 11. <i>Autoclave</i> (or pressure cookers)—suitable size | 53 | 24 | 6 | ... |
| proper construction | 5 | 15 | ... | ... |
| equipped accurate thermometer | ... | 3 | ... | ... |
| accurate pressure gauge | 141 | 4 | ... | ... |
| safety adjusted | 5 | 5 | ... | ... |
| | 0 | ... | ... | ... |

* DEV = Deviation; UND = Undetermined; NOT = Not Used

ories, 4 laboratories surveyed used the direct microscopic method and one additional laboratory used methylene blue reduction as the sole procedure in the control of retail pasteurized and raw milk. Since the agar plate method was so universally used, it was believed that a summary of the procedures used by those laboratories would be of most interest. Accordingly, compilations were made of the number of laboratories conforming to, and deviating from, each item of equipment, preparation, technic, and reporting required by Standard Methods.

In the interest of clarity, the figures presented in the following tables list only *deviations*, items *undetermined* because of local conditions at the time of the survey, or items *not used* in the particular laboratory. Thus, at a glance one may single out common deviations, and some of these will be discussed briefly. The entire survey form for the agar plate method has been divided into portions, and the material arranged so the results could be tabulated. The last 161 of the 276 laboratories reported upon were recorded on the revised forms and, in preparing the tables, the results of the first 115 laboratories recorded on the earlier form were also tabulated upon the present forms. This resulted in some instances in unduly large figures for items marked *undetermined*, where such an item was not included on the original forms. Likewise, the earlier surveys were based on the 7th edition of Standard Methods while the revised forms, based on the 8th edition, included four additional items. Consequently, these were marked "not used" when transferring the earlier surveys to the revised forms.

The requirements of Standard Methods pertaining to *apparatus*, are listed in Table 1.

As shown in *Item 4*, half of the laboratories were using, in whole or in part, pipettes that did not meet the speci-

cations required by Standard Methods. Their use naturally resulted in errors in measurement also, as will be seen later. Similarly, nearly half of the laboratories used dilution bottles without markings, consequently errors in volume (which were quite common, as will be seen later) would not be observed. It is interesting to note that nearly 20 per cent were not using solid stoppers or leak-proof closures, with consequent failure to agitate the dilutions as required by Standard Methods (also to be seen later).

Less than 20 per cent of the laboratories had checked the accuracy of the thermometers used in incubators, as shown in *Item 7*. Considering the incubators proper, 75 per cent had suitable incubators, although less than half had checked the temperature variations of the incubators in use. Approximately one-fourth of the incubators in use were smaller than the minimum required by Standard Methods. As far as could be ascertained, all incubators were kept in a room of suitable temperature, being one of the five items of the total 165 items of equipment and procedure recorded on this form for which deviations were not noted in any laboratory. The last requirement in item 8 appeared in the 8th edition only, accounting for the large numbers in the "not used" column.

As shown in *Item 9c*, the form included one item of equipment not now *required* by Standard Methods, namely a constant temperature water bath or incubator for holding melted agar. Since lack of this control was the most common reason for trouble with precipitates in using the standard milk agar, this item was included but marked (desirable).

It is important to note (*Item 9d*) that only half of these official laboratories had an approved colony counter. It may be said now that in spite of the usual deficiencies in other equipment

and common errors in technic, some of the greatest errors in results were due to failure of laboratories to observe the actual colonies present on their own plates, usually due to lack of, or an inadequate, counting device

The information on hot air ovens and steam pressure sterilizers is presented in *Item 10*. To many the least important requirement in Standard Methods is that concerning checking temperature variations within the hot air oven. Usually laboratories tend to use higher

temperatures or longer periods of sterilization than the minimum, or exceed in both respects. Occasionally, however, a laboratory will operate the oven at the minimum time and temperature listed in Standard Methods, without realizing there may be a number of degrees variation within the oven. A few laboratories were visited in which they had discovered this by sad experience. It is to be noted that over one-fifth of the laboratories felt able to operate their sterilizing ovens without

TABLE 2

Summary of Items Pertaining to Preparation of Materials Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

| Item | Total Laboratories 276 | DEV* | UND* | NOT* |
|---|------------------------|------|------|------|
| 12. <i>Sterilization</i> —Sampling and plating equipment: dry heat whenever possible | 17 | 4 | 1 | |
| not less 160° C. | 26 | 53 | 10 | |
| not less 1 hour | 7 | 7 | 11 | |
| not crowded | ... | 1 | 16 | |
| if chance of careless operation, record temperature used | 12 | 24 | 225 | |
| record time attained, discontinued | 6 | 23 | 231 | |
| Media, dilutions: autoclave 121° C. (place reliance on mercury thermometer, not on pressure gauge) | 112 | 89 | ... | |
| not less than 20 minutes | 15 | 7 | ... | |
| not crowded | 1 | 2 | ... | |
| air removed | ... | 5 | ... | |
| tight stoppers loosened | 4 | 2 | 1 | |
| if chance of careless operation, record temperature used | 12 | 23 | 225 | |
| record time attained, discontinued | 7 | 23 | 229 | |
| 13. <i>Cleansing</i> —Pipettes: cleaning solution used frequently | 13 | 11 | ... | |
| subsequent rinse | 1 | 7 | ... | |
| Glass and metal ware: rinsed thoroughly in clean water after washing | ... | 1 | ... | |
| acid or alkali not found by suitable indicator | 2 | 97 | ... | |
| 14. <i>Media</i> —correct formula (beef extract, tryptone, glucose, best quality agar), or dehydrated media | 52 | 3 | ... | |
| distilled water | 19 | 2 | ... | |
| skim milk | 72 | 1 | ... | |
| use glass or suitable utensils free from toxic metals | 4 | 19 | ... | |
| prevent specks of dried or undissolved agar | 0 | ... | ... | |
| prevent undissolved milk powder or its precipitates | 18 | 86 | 1 | |
| unless dehydrated or within range, adjust to pH 6.6–7.0 | 7 | 2 | ... | |
| use suitable pH standards or equipment | 10 | 44 | 56 | |
| lost weight restored with hot distilled water (unless dehydrated) | 1 | 6 | ... | |
| if necessary, suitable clarification not affecting nutritive properties | 1 | 1 | ... | |
| suitable containers | 1 | ... | ... | |
| amount in containers limited so any part is within 2.5 cm. of surface | 30 | 10 | ... | |
| suitable storage of flasks or bottles | 1 | 1 | ... | |
| final pH determined immediately before batch is used | 201 | 16 | ... | |
| and pH recorded | 253 | 10 | ... | |
| 15. <i>Dilutions</i> —suitability of waters determined by plating dilutions periodically for 30 minutes | 242 | 6 | ... | |
| not used if cause decreased count | ... | 247 | ... | |
| retested occasionally for freedom from toxic substances | 259 | 8 | ... | |
| prevent precipitates from the water | 1 | ... | ... | |
| volume necessary before sterilization predetermined | (57) | (10) | ... | |
| each bottle observed for volume deviation | (18) | (9) | ... | |
| discard if variation from 99 ml. exceeds ± 2 ml. | (122) | (14) | ... | |
| or proportional tolerance if smaller quantities | (30) | (7) | ... | |
| or used promptly if measured sterilized water is added aseptically to sterile bottles | 135 | 38 | ... | |

* DEV = Deviation; UND = Undetermined; NOT = Not Used

TABLE 3

Summary of Items Pertaining to Technic in Making Dilutions Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

| Item | Total Laboratories 276 | DEV* | UND* | NOT* |
|---|------------------------|------|------|------|
| 16. <i>Plate marking</i> —before making dilutions arrange in order | 36 | 4 | ... | |
| identify with sample number | 2 | 1 | ... | |
| mark with dilution | 1 | 8 | 1 | |
| 17. <i>Sample agitation</i> —agitate vigorously | 12 | 12 | ... | |
| mix thoroughly | 11 | 13 | ... | |
| immediately before removing portion | 42 | 10 | ... | |
| before opening container remove all material from closure which may contaminate sample | 2 | 15 | ... | |
| Sample bottles and vials: shake 25 times | 44 | 14 | 80 | |
| up and down excursion | 80 | 10 | 80 | |
| about a foot | 105 | 13 | 80 | |
| within 7 seconds | 12 | 16 | 80 | |
| 18. <i>Dilution agitation</i> —immediately before removing portion | 35 | 8 | ... | |
| shake 25 times | 81 | 4 | ... | |
| up and down excursion | 159 | 2 | ... | |
| about a foot | 227 | 9 | ... | |
| within 7 seconds | 20 | 12 | ... | |
| 19. <i>Sample measurement</i> —separate sterile pipette for each sample | ... | 2 | ... | |
| pipette not wiped or dragged across lip or neck | 1 | 6 | ... | |
| measure accurately | 128 | 40 | ... | |
| no extra drops falling in | 24 | 41 | ... | |
| let column drain | 3 | 1 | ... | |
| blow out last drop quickly | 106 | 20 | 14 | |
| pipette not rinsed in dilution | 20 | 3 | ... | |
| <i>Cream</i> —preferably weigh 1.0 gm. aseptically | ... | 5 | 267 | |
| into sterile butter-boat or into dilution bottle | ... | 4 | 267 | |
| on accurate cream test torsion balance or equivalent sensitivity | ... | 4 | 267 | |
| if use pipette, free from air bubbles | ... | 238 | 32 | |
| and volume delivered predetermined | 151 | 88 | 32 | |
| 20. <i>Dilution measurement</i> —separate sterile pipette for each successive dilution | 7 | 2 | ... | |
| pipette not wiped or dragged across lip or neck | 3 | 7 | ... | |
| measure accurately | 89 | 89 | ... | |
| no extra drops falling in | 12 | 39 | ... | |
| tip of pipette at 45° angle | 1 | 2 | ... | |
| touching neck of dilution bottle or rod in stopper | 174 | 41 | ... | |
| touching Petri dish | 71 | 10 | ... | |
| let column drain | 5 | 4 | ... | |
| touch once against dry glass | 182 | 24 | 16 | |
| Petri dish cover raised carefully just enough to insert pipette | 5 | 1 | ... | |
| 21. <i>Dilution selection</i> —2 dilutions plated per sample (single plate restricted to supplies uniformly yielding 30-300 colonies) | 90 | 16 | ... | |

* DEV = Deviation; UND = Undetermined; NOT = Not Used

thermometers. Only half of the steam pressure sterilizers in use were equipped with thermometers.

The requirements of Standard Methods pertaining to the general *preparation* and sterilization of materials, media and dilutions, are presented in Table 2. The sterilization procedures are summarized in *Item 12*. In general these were satisfactory, although lack of control by thermometer is shown, particularly in the steam sterilization.

The cleansing of glassware, shown in *Item 13*, was, as would be expected,

apparently well done in almost every laboratory.

The standard tryptone glucose extract agar was in use by 80 per cent of the laboratories, over 90 per cent of which added skim milk, 85 per cent of the latter using this without trouble with precipitates (*Item 14*). However, only 20 per cent of the laboratories checked the final pH of the media, and only 5 per cent kept a record of this detail.

The deviations in dilutions are shown in *Item 15*. Only 10 per cent of the laboratories had ever tested the suita-

bility of the water used for dilution. Deviations in volume were quite common, less than 40 per cent being within the tolerance allowed. Variations of 10 ml. per 99 ml. blanks were not infrequent, and an extreme variation from approximately 60 ml. to 140 ml. was observed. Certain aspects of deviations were noted separately (segregated by parentheses in the tabular material) for the 135 laboratories deviating in one or more of those four requirements.

The requirements of Standard Methods pertaining to *technic* in making dilutions are summarized in Table 3.

The agitation of samples is summarized in *Item 17*. In general the retail samples were well mixed, and 80 per cent of the laboratories did this immediately before removal of the portion for analysis. Samples in smaller bottles

and vials, however, were not agitated, as prescribed, by a considerable portion of the laboratories. Similarly, a majority of the laboratories failed to agitate dilutions (*Item 18*) as vigorously as prescribed in Standard Methods. A number of laboratories did not use small sample bottles or vials, or used other methods with milk in such containers, accounting for the larger numbers in the "not used" column.

In *Item 19* it may be seen that inaccurate volumetric measurements were made in over half of the laboratories, partly as a result of not having standard pipettes, and partly due to improper manipulation.

Similarly, errors were made in measurement of the dilution itself, as may be seen in *Item 20*. *Item 21* shows that over one-third of the laboratories

TABLE 4

Summary of Items Pertaining to Plating and Incubation Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

| <i>Item</i> | <i>Total Laboratories 276</i> | <i>DEV*</i> | <i>UND*</i> | <i>NOT*</i> |
|--|-------------------------------|-------------|-------------|-------------|
| 22. <i>Plating</i> —dilution control, each series of samples, each lot blanks | 100 | 10 | ... | |
| agar control at end | 25 | 1 | ... | |
| [desirable, melted agar kept only short time | 3 | 3 | ... | |
| 45°–50° C. | 113 | 87 | ... | |
| thermometer in container of water as temperature control in water bath or incubator] | 252 | 8 | ... | |
| after depositing desired portions, introduce 10–12 ml. of agar per plate | 17 | 8 | ... | |
| liquefied, not lumpy | 2 | 3 | ... | |
| at 41°–44° C. | 10 | 192 | ... | |
| within 20 minutes after transfer from sample | 30 | 24 | ... | |
| Petri dish cover raised carefully just enough to pour agar | 12 | 3 | ... | |
| flame lip of media container before pouring | 10 | 2 | ... | |
| periodically thereafter | 41 | 11 | 2 | |
| agar and sample thoroughly mixed | 7 | 59 | ... | |
| spread evenly | ... | 1 | ... | |
| by rotation and tilting | 99 | 27 | 1 | |
| without splashing | 15 | 11 | ... | |
| solidified quickly | ... | 1 | ... | |
| on level surface | 1 | 1 | ... | |
| inverted (unless clay tops are used) | ... | 2 | ... | |
| placed in incubator at once | ... | 3 | ... | |
| record time of plating if interval between sampling and plating exceeds 4 hours | 111 | 67 | ... | |
| 23. <i>Incubation</i> —plate piles at least 1 inch from each other | 98 | 61 | ... | |
| and from tops and walls | 54 | 38 | ... | |
| piles on successive shelves not staggered | 7 | 2 | ... | |
| incubated 48 hours | 2 | 1 | ... | |
| 35°–37° C. or 32° C. | 31 | 59 | ... | |
| thermometer in securely stoppered container of liquid (or accurate maximum-minimum thermometer) as temperature control on top shelf and on bottom shelf (or in portion of incubator room used) | 253 | 3 | ... | |
| temperatures recorded daily when in use for milk plates | 262 | 1 | ... | |
| excess humidity avoided | 2 | 2 | ... | |
| excess ventilation avoided (weight loss within 15%) | ... | 1 | ... | |

* DEV = Deviation; UND = Undetermined; NOT = Not Used

surveyed did not make suitable dilutions to yield the required number of colonies per plate for proper accuracy.

The deviations in *plating* and *incubation* are shown in Table 4. Over one-third of the laboratories did not plate out controls regularly. The large number of laboratories having no constant temperature control over melted agar resulted in the large numbers in the "*undetermined*" column concerning the temperature of agar when poured. The actual technic of plating was fairly well done in general, as would be expected in laboratories accustomed to plating.

There was failure to control the temperature of incubation in accordance with Standard Methods, comparatively few laboratories doing this correctly, as shown in *Item 23*. Temperatures of 33°–42° C. were observed in incubators

supposedly operating at 37° C. Only five laboratories were noted in which the optional 32° C. incubation was being used.

The deviations in *counting* are shown in Table 5.

In spite of all other errors in equipment, preparation of material, technic of plating and incubation, the greatest effects observed upon the accuracy of results occurred where the proper plates for counting were not selected, the requirements of Standard Methods not being followed, or where laboratory workers failed to observe a considerable percentage of colonies on their plates, largely due to inadequate counting equipment. That this was quite common is shown in *Item 24*.

The two items marked with an asterisk and shown with large numbers in the "*not used*" column in *Item 24*, are

TABLE 5

Summary of Items Pertaining to Counting and Reporting Counts Used in Bacterial Plate Count Indicating Lack of Conformity with Standard Methods for the Examination of Dairy Products (8th Ed.)

| Item | Total Laboratories 276 | DEV* | UND* | NOT* |
|---|------------------------|------|------|------|
| 24. Counting plates—count within 48 hours \pm 3 hours, or place in refrigerator under 50° F. | | | | |
| for not over 16 hours (not routine) | 6 | 5 | ... | |
| average all plates with 30–300 colonies and no others (except average all plates of same dilution) | 171 | 36 | ... | |
| if higher plate count is more than twice the lower, record the lower * | 38 | 35 | 164 | |
| count all visible colonies on entire plate including pin points | 72 | 33 | ... | |
| count spreaders as single colony | 2 | 2 | ... | |
| if indication that spreader has repressed other colonies do not count plates | 0 | ... | ... | |
| if spreader covers more than half the plate do not count * | ... | ... | 161 | |
| not more than 5 per cent of plates $\frac{1}{4}$ covered with spreaders | 13 | 3 | ... | |
| use approved counting aid | 111 | 11 | ... | |
| any doubtful particles examined carefully | 36 | 42 | ... | |
| use hand tally | 141 | 6 | ... | |
| duplicate own counts within 5 per cent | 20 | 128 | ... | |
| duplicate other's counts within 10 per cent | 52 | 93 | ... | |
| if no plates 30–300, use that nearest 300 | 6 | 34 | ... | |
| Estimations of plates exceeding 300: (a) if 5–10 colonies per sq. cm. count 12–14 sq. cm. areas, or if over 10 count 4 areas; factor for multiplication determined; or (b) use counting plate with radiating sectors and count colonies in opposite sectors | 79 | 66 | ... | |
| 25. Reporting counts—report as "standard plate count" per ml. | 57 | 34 | ... | |
| record which temperature used | 49 | 19 | 204 | |
| record kept of dilutions used | 108 | 16 | ... | |
| of colonies on each plate counted | 134 | 14 | ... | |
| multiply by proper factor | 15 | 6 | ... | |
| use only two significant figures | 129 | 17 | ... | |
| raise if figure dropped is 5 or more, lower if 4 or less | 163 | 27 | 1 | |
| if plates developing less than 30 colonies must be used, report as "less than 3,000 per ml." if 1:100 dilution used, etc. | 140 | 22 | 110 | |
| if all plates show no growth report as unsatisfactory * | ... | 1 | 160 | |
| 26. Control—if bacteria failing to grow are suspected, check by direct method or additional plates at suitable temperatures | 8 | 121 | 121 | |

* DEV = Deviation; UND = Undetermined; NOT = Not Used

required only under the *Milk Ordinance and Code* recommended by the U. S. Public Health Service; hence their listing as "not used" in communities not operating under this ordinance. In many places suitable plates were not available at the time of the survey, again resulting in larger numbers in the "undetermined" column concerning duplication of counts within the tolerances listed by Standard Methods.

Finally, records were not kept as required by Standard Methods, as shown in *Item 25*. It might be mentioned that in several instances, laboratories failed to multiply correctly, and an original record of the dilution and colonies actually counted, would serve as a check on such errors. In at least 2 instances the mathematics of multiplying for a 1:100 dilution were too complicated. In one instance, in a small town for years, and in another in a metropolitan city for months, only one cipher had been used in multiplying for the 1:100 dilution.

The requirements concerning the recording of the incubation temperature used, and the reporting of plates with less than 30 colonies, were included only in the 8th edition, hence the larger numbers for these details in the "not used" column, together with one item (marked with an asterisk) required only under the *Milk Ordinance and Code* recommended by the U. S. Public Health Service.

While some of the requirements in Standard Methods may seem trivial, I believe I have seen practically every item violated sufficiently by some laboratory to influence the accuracy of the analysis.

The surveys show that each item required by Standard Methods has been adhered to by several laboratories, practically each item has been neglected by one or more laboratories. No one laboratory, at the time surveyed, had actually met all requirements in equipment and procedure, although a very few approached this. No laboratory conformed in all items of even the general group on apparatus, or technic. One laboratory conformed in preparation, one in incubation, 11 in counting, and 25 in reporting results, as shown in Table 6. This table also classifies the nature of the laboratories included in this report.

Almost universally it was the intention to follow Standard Methods, and the laboratories considered that the procedures they demonstrated conformed to Standard Methods. When the actual requirements were explained in respect to the deviations noted, and the proper equipment, technic, or procedure indicated or demonstrated, together with the reasons for such requirement; and when the probable inaccuracies of the local practice were pointed out, it was apparently the first time that a real understanding of certain requirements in

TABLE 6

| Primary Nature of Laboratories | | Conformed with Standard Methods in | | | | |
|------------------------------------|-----|------------------------------------|---------|------------|----------|-----------|
| | | Apparatus Preparation | Technic | Incubation | Counting | Reporting |
| State—Health Department | 31 | .. | .. | 1 | 2 | 4 |
| State—Agriculture Department | 6 | .. | .. | .. | .. | 2 |
| State—Miscellaneous | 6 | .. | .. | .. | 1 | .. |
| State—Health Department Branch | 24 | .. | 1 | .. | 1 | 4 |
| County—Health Department | 36 | .. | .. | .. | 2 | 2 |
| County—Health Department Milk only | 10 | .. | .. | .. | 2 | 5 |
| City—Health Department | 103 | .. | .. | .. | 3 | 7 |
| City—Health Department Milk only | 28 | .. | .. | .. | .. | 1 |
| Private—Clinical | 16 | .. | .. | .. | .. | .. |
| Private—Milk only | 8 | .. | .. | .. | .. | .. |
| Hospital— | 8 | .. | .. | .. | .. | .. |
| | 276 | 0 | 1 | 0 | 11 | 25 |

Standard Methods had been obtained. Sometimes it was true that Standard Methods had not been consulted, no copy being available, or that only an earlier edition was on hand. Several 1934 editions, a very few 1929 editions, and once or twice a 1923 edition, were unearthed. On the other hand, individuals have been known to refer to Standard Methods, and after reading the various possibilities discussed there, to do just opposite to the interpretation placed on the material by the Standard Methods Committee itself. Having witnessed the items incorrectly performed by the individual workers, the reasons for the requirements were discussed with them and a copy of the survey form summarizing the actual requirements of Standard Methods was left with them. This should result in immediate improvement in so far as technic is concerned, at least in the elimination of faulty practices not dependent upon equipment. The written recommendations made later on equipment focused attention on these deficiencies, putting this on record with the administrative officials, and indicating the basis for correction.

In size, the laboratories varied from that used once a month or so for milk analysis, to large general laboratories in metropolitan city health departments. In general, the larger laboratories were better equipped, but not necessarily so. Similarly, their technic might be expected to be above average, but in each of the largest laboratories visited, errors were made with a direct effect upon the accuracy of the results reported.

Few states have supervised to any extent laboratories within their area, and various systems have been used by the

several states doing this, ranging from voluntary action to supervision in accordance with an act of legislature. Various factors influenced the type of supervision, this probably being best where the state laboratory administrator himself visited laboratories periodically. However, such persons are usually not specialists in milk analysis, and while in general the supervised laboratories were rather uniform in equipment and procedures, vital details have been overlooked in regard to technic, and in selection of, or in reporting, results. In many states there is no reliable source of advice or consultation, and it would seem desirable to foster such a service.

It is believed the U. S. Public Health Service survey forms should be of value to administrators in improving the work of laboratories in their jurisdiction. Likewise, they should be useful as a guide to the worker in service, and should be particularly helpful to those training new workers, inasmuch as this would give all workers something more tangible to follow than, for example, the 25-30 pages discussion in Standard Methods on the agar plate method. Use of such forms should also result in the methods now standard actually being followed by laboratories; something which we assumed was being done, but obviously has not been practised.

When one considers the help that bacteriological examinations have given in the sanitary control of milk, and considers the errors of omission and commission in following Standard Methods as listed here, the possibility is evident of their being even more useful and better correlated in the sanitary control of milk when they are properly performed.

Encephalitis (Western Equine) in Manitoba—1941*

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I KNOW it will seem to many of you like "bringing coals to Newcastle" to discuss in St. Louis the question of Encephalitis. However, following the epidemic of western equine encephalitis which occurred in 1941 in North Dakota, Minnesota, Saskatchewan, and Manitoba, we in Manitoba thought that we should carry on some experimental work in respect to the availability of a worth while immunizing agent; and, although the work in this connection is not as yet quite complete, we appreciate this opportunity of presenting certain material which we trust may be of interest and value.

Before discussing our immunization experiment we would like to give a short summary of the epidemiological features of the epidemic which occurred in Manitoba in 1941. A complete report of this epidemic will be found in

the June, 1942, edition of the *Canadian Public Health Journal*. The epidemiological summary is taken from a paper in the report prepared by Drs. C. R. Donovan, and Maxwell Bowman, both of the Manitoba Department of Health and Public Welfare. The epidemic of western equine encephalitis in Manitoba was only part of a much wider epidemic affecting the States of Minnesota and North Dakota, and the Provinces of Saskatchewan and Manitoba.

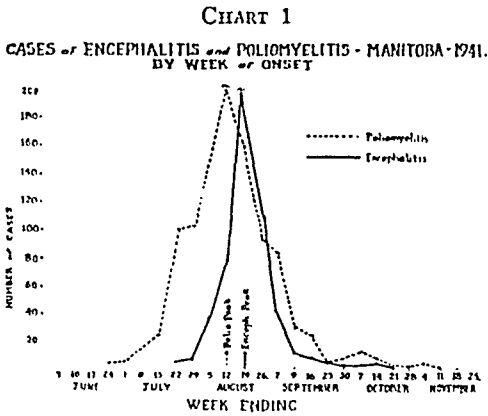
After the disease became epidemic we requested our Division of Statistics to check back on the deaths during the epidemic and preëpidemic period and learn what the general death picture looked like in comparison to other years. This survey pointed out that there seemed to be a definite increase in deaths reported from certain types of conditions, such as cerebral throm-

TABLE 1
Encephalitis Cases and Deaths in Epidemic Area—1941

| <i>Province or State</i> | <i>Cases</i> | <i>Attack Rate per 100,000 Population</i> | <i>Deaths</i> | <i>Case Fatality Rate</i> |
|------------------------------|--------------|---|---------------|-------------------------------|
| North Dakota | 1,101 | 172 | 134 | 12.3 |
| Minnesota | 804 | 29 | 86 | 10.7 |
| Saskatchewan | 543 | 61 | 44 | 8.1 |
| Manitoba | 509 | 71 | 78 | 15.3 |
| Total | 2,957 | 58 | 342 | 11.6 |

* Presented at a Joint Session of the Health Officers, Laboratory, and Epidemiology Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

bosis, hemoplegia, sunstroke, and in children, convulsions. In all instances deaths reported from these causes were referred back to the physician in attend-



ance for a review; and, as a result of this, the cause of death in 5 cases was changed by the physician to "encephalitis." This probably accounts in some measure for the higher case fatality rate shown for the Province of Manitoba.

There was some delay in Manitoba in the appreciation of the fact that we had an epidemic of encephalitis in the making. We believe this was more or less to be expected because we were in the midst of an epidemic of poliomyelitis when the first cases of encephalitis started to appear, as Chart 1 shows; and, many early cases were diagnosed as poliomyelitis. In checking back over our records it would appear that the true epidemic started July 16 with a case in the City of Winnipeg; and sporadic cases appeared in widely separated points between that date and August 1. Each day thereafter showed a continued increase in cases and invasion of new areas until the whole of the settled parts of the Province, exclusive of the coniferous regions, were involved. The peak of the epidemic was reached during the week of August 19, one week after the peak of the epidemic of poliomyelitis—following which there was a rapid subsidence of reported cases until the epidemic could be considered to be over on or about the middle of September.

The significant points with regard

to sex and age distribution of the reported cases are (1) a very high attack rate of infants under 1 year of age; and, I venture to say that a good many cases which occurred in this age group were not reported, probably because no physician was called, and therefore no diagnosis made; (2) a relatively low attack rate in the group which gives the highest attack rate for poliomyelitis; i.e., the age groups 1 to 20 years; and (3) a high attack rate in what might be classified as the "working-age" group; i.e., from 20 to 50 years.

Due to scarcity of labor a great many males in the older age group who had retired returned to work on the farms; and this is possibly one of the reasons why the age groups 50 years and over showed such a high attack rate. Chart 2 indicates that in every age group, excepting that under 1 year, the attack rate was considerably higher in males than in females—approximately two to one. Eighty-one per cent of the cases were in individuals of 20 years of age and over.

CHART 2
ENCEPHALITIS in MANITOBA - 1941.
CASE RATES BY SEX in AGE GROUPS per 100,000.

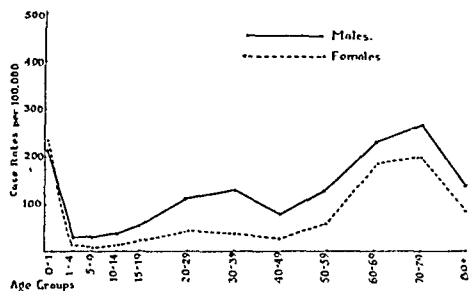


TABLE 2
Western Equine Encephalitis
Manitoba — 1941
Urban and Rural Distribution

| Distribution | Number of Cases | Per cent Total Cases | Attack Rate per 100,000 Population |
|--------------|-----------------|----------------------|------------------------------------|
| Urban | 166 | 32.6 | 57.0 |
| Rural | 343 | 67.4 | 79.6 |

Table 2 shows the urban and rural distribution of cases, with percentages as well as the attack rate in each group.

Western equine encephalitis would definitely seem to be a disease of adult males in the older age groups, and adult males who work out of doors.

An attempt was made to try to estimate the prevalence of disabilities of various descriptions, both total and partial, which might result from an epidemic of western equine encephalitis.

A study of 256 cases was made in the spring and early summer of 1942, 10 months after the epidemic. Only 139 of these individuals, or 54.3 per cent, had completely recovered.

I would like to emphasize that our data are based on complaints of the patients themselves obtained through interviews by a public health nurse, or as happened in a few instances, by a letter addressed to the patient when an interview was not possible. As to the 45 per cent not yet fully recovered, I do not think we can blame the encephalitis entirely for their present condition. It must be remembered that a high percentage of them were in the older age groups and subject to the usual aging processes. However, it would appear that this disease may at least accelerate the normal aging process. Table 3 shows the disabilities complained of in order of frequency.

A case history which was brought to my attention just the day before I left Manitoba for this Conference is of interest from the standpoint of possible disabilities. Early in August, 1941, Mr. J., aged 92 years, was exposed to mosquitoes for a period of some two or three hours while sitting in his garden. This was the only occasion he had been out of a well screened house all summer. Two weeks later he developed a mild illness with some fever and mental disturbance. Recovery was complete with the exception of a certain amount of disorientation. A diagnosis of encephalitis

TABLE 3

Western Equine Encephalitis—Manitoba, 1941
Survey of 117 Cases Showing Disability Com-
plained of Approximately Ten Months
After Onset

| | Cases | Per cent |
|---------------------|-------|----------|
| Tired and weakness | 70 | 27.3 |
| Headache | 46 | 18.0 |
| Memory changes | 27 | 10.5 |
| Nervousness | 26 | 10.2 |
| Pain in extremities | 23 | 9.0 |
| Mental changes | 17 | 6.6 |
| Backache | 17 | 6.6 |
| Blurred vision | 11 | 4.3 |
| Insomnia | 10 | 3.9 |
| General malaise | 8 | 3.1 |
| Diplopia | 8 | 3.1 |
| Paresis | 5 | 2.0 |
| Dizziness | 4 | 1.6 |

itis was made due to the fact his wife had definite encephalitis a few days after his illness. Mr. J. died of pneumonia on May 30, 1942. A post-mortem examination was performed and the pathologist's report, in part, reads as follows: "Microscopic sections of the pons showed small areas of necrosis and gliosis with small areas of perivascular infiltration and cuffing. Diagnosis—Active Encephalitis." This diagnosis was made 10 months after the initial infection.

Dr. Harry Medovy, Pediatrician at the Winnipeg Children's Hospital, who made a special study of the infants under 1 year of age who had contracted the disease, indicates, in a paper which has been accepted for publication in the *Journal of Pediatrics*, that, of 17 cases studied, 5 show definite evidence of disability which probably will be permanent. Dr. Medovy also reports on 2 cases of intrauterine infection of the new-born. Both mother and baby in each instance showed the onset of illness approximately 5 days after confinement. Both babies are completely spastic and will be permanently incapacitated.

One cannot leave the question of disability without giving some consideration to how such an epidemic affects an all-out war effort. Manitoba is basically

a farming community and the effect of this epidemic on this basic industry was very considerable; especially as the epidemic made its appearance at the height of the harvest season. As near as we are able to ascertain at least 200,000 man-hours of labor were lost, just at the time when they were most urgently required to harvest the wheat and other grain crops.

In respect to the Army and Air Forces it is not possible to give the number of cases or the attack rate among those young men who had joined the colors. However, we may say that since the occurrence of the epidemic over one-third of the cases which occurred in the armed forces have since been discharged as "medically unfit" to take further training.

Taking into consideration the more or less disastrous results of this epidemic—and I might say here that the casualties from it were greater than the casualties the Manitoba troops suffered as a result of the Dieppe Raid—it was thought that something should be done in order to be prepared better in case of a future visitation, which we anticipated might take place in 1942. Fortunately, our fears were not realized, as few cases have been reported. However, when the problem was under consideration the most urgent need seemed to be to ascertain whether or not the vaccine given to laboratory personnel working with the virus, was as effectual an immunizing agent for man as the vaccine which has been widely used since 1937 for the protection of horses. We also wished to ascertain the dangers, if any, of its use; and what might be expected in the way of reactions. It was decided that we would try to immunize in Manitoba a large enough group in our population, particularly in rural areas, to give us a true cross-section of the male age groups which had been the most seriously affected in the 1941 epidemic. This immunization

was on an entirely voluntary basis. Fourteen centers were selected, located principally in areas in which there were municipal doctors or salaried physicians.

The age group 21 years and over of the male population was chosen for the experiment, and in each of the 14 areas enough vaccine was distributed to immunize 50 per cent of this group. It was thought that the total group might be in the neighborhood of 3,000 persons, according to the areas and population selected. The greatest possible coöperation was received both from the public and the medical profession. If vaccine had been available and our plans had been more flexible, the total vaccinated could have been at least 5,000, as many more individuals signified their willingness to assist in this experiment than we were able to immunize. As a prerequisite of vaccination it was decided that we would obtain samples of blood from one in three of the persons being vaccinated. In all, some 1,000 pre-vaccination bloods were collected. As we had no laboratory facilities in our own province for the examination of these bloods they were examined for us by Dr. Charles A. Mitchell, Acting Dominion Animal Pathologist in the Federal Department of Agriculture, Hull, Quebec; through the kind coöperation of Dr. G. D. W. Cameron, Chief of the Laboratory of Hygiene in the Department of Pensions and National Health, Ottawa. It was found that 186 of the 926 specimens of blood examined, or 20 per cent, showed the presence of neutralizing antibodies in the individuals from whom the bloods were taken before immunization. Some 40 blood specimens of close contacts of cases were examined and the results were identical with those in this group. We believe that contact with a case, no matter how close, will not produce any immunity to the disease.

The vaccine used in the Manitoba immunization experiment was prepared

by the Lederle Laboratories and was a formalized chick embryo vaccine. Therefore, it would not appear that there should be any danger of inducing experimental infection. Our experience leads us to believe that no such danger exists, as in none of the persons immunized did any of the reactions suggest an infection of encephalitis. However, there were many mild reactions. We endeavored to obtain reports on all persons immunized and were successful in getting 1,754 reports. Table 4 gives the results of a study of the reports received.

TABLE 4
Western Equine Encephalitis
Reactions to the Administration of Chick
Vaccine

| | |
|--|-------------|
| Total number vaccinated (2 doses) | 2,803 |
| Total number questionnaires returned | 1,754 |
| No reactions to either dose of vaccine | 768 (43.8%) |
| Reaction first dose—local, general, or combined | 582 (33.2%) |
| Reaction second dose only—local, general, or combined | 404 (23.0%) |
| Total reactions first and second dose, or both—local, general, or combined | 986 (56.2%) |

All evidence that we were able to obtain indicates that the reactions were not severe and did not require treatment by a physician. Certainly one is safe in saying that the reactions following the use of this particular preparation of chick embryo vaccine, although possibly more numerous, were not as severe as reactions following the use of either

scarlet fever toxin or typhoid vaccine.

The full program for the sampling of bloods taken two to three months after the second dose of vaccine is not as yet complete, so that we are only able to report on a limited number of samples which were requested by Dr. John R. Paul of Yale University, and which were examined by Drs. Albert B. Sabin and Robert Ward of the Children's Hospital Research Foundation, at Cincinnati, Ohio. We are indebted to them for permission to give this information at this time (see Table 5).

These results are in agreement with those of Beard, et al.¹ at Duke University; and with the two more recent studies by Dr. Albert B. Sabin and his assistants at the Children's Hospital Research Foundation at Cincinnati; and by Drs. Webster and Casals of the Rockefeller Institute.

We are also informed by Dr. Charles A. Mitchell of Hull, Quebec, that in a series of 25 persons immunized in his laboratory with two doses of chick embryo vaccine, 100 per cent showed the presence of neutralizing antibodies following the completion of the immunization. It is hoped that when our vaccination experiment is completed we will add to the information already available as to the value of the vaccine for the production of neutralizing antibodies. We also hope to gain some experience as to what care is required in the matter of storing and shipping bloods when no immediate laboratory

TABLE 5

Effect of Western Equine Encephalomyelitis Chick Embryo Vaccine in Human Beings without Neutralizing Antibodies for the Virus before Vaccination

| No. of Doses of Vaccine | Time after First Dose (Weeks) | Individuals Total No. | Positive | | Equivocal | | Negative | |
|------------------------------------|--|-----------------------------|----------|----------|-----------|----------|----------|----------|
| | | | No. | Per cent | No. | Per cent | No. | Per cent |
| 1 (1 ml.) | 1 | 30 | 5 | 17 | 5 | 17 | 20 | 66 |
| | 2 | 13 | 6 | 46* | 2 | 15 | 5 | 39 |
| 2 (1 ml. each dose 1 wk. apart) | 2 | 17 | 17 | 100† | 0 | | 0 | |

* Average neutralization index = 800

† Average neutralization index = 6,000+

facilities for examination are available.

We intend to continue the immunization experiments in Manitoba with the expectation that ultimately clinical evidence will become available as to whether or not the vaccine is of sufficient value to justify its distribution on a free basis to physicians and medical officers of health.

SUMMARY

1. A short synopsis is given of the epidemiological features of an epidemic of western equine encephalitis in Manitoba in 1941, which indicates that this disease has the highest attack rates in infants under 1 year, and in adult males who live and work outdoors in rural areas. Evidence is presented which suggests that sequelae may be much more prevalent than is generally supposed and indicates that further follow-up of cases is required.

2. An experimental vaccination program on 3,000 persons is discussed. The information obtained from this work leads us to believe that

a. There does not seem to be any contra-indication to the use of the vaccine, and that,

although reactions may be numerous, they are not severe.

b. Two doses of the vaccine results in developing neutralizing antibodies in probably 100 per cent of persons vaccinated.

c. As yet there is not sufficient evidence available, especially of a clinical nature, to draw any conclusions as to the efficacy of the vaccine in protecting vaccinated individuals against the disease.

d. The results so far justify the continuation of experimental work in order that the clinical value of the vaccine may be ascertained.

NOTE: We would like to express our deep appreciation once again for the assistance of Dr. John R. Paul of Yale University; Drs. Albert B. Sabin and Robert Ward of Cincinnati, Ohio; and Drs. G. D. W. Cameron and Charles A. Mitchell, of the Federal Government of Canada. Without their help this report would have been impossible. We also desire to express our appreciation of the assistance received from Dr. W. G. Malcolm and Dr. Carey of the Lederle Laboratories at Pearl River, N. Y.

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Comparison of the Nasopharyngeal Swab and the Cough Plate in the Diagnosis of Whooping Cough and *Hemophilus pertussis* Carriers*

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THE nasopharyngeal swab, which has been used in the past in the diagnosis of pneumonia and in the detection of meningococcus carriers, was adapted by Bradford, Slavin, and Brooks^{1, 2} to the diagnosis of whooping cough. The value of this method has been confirmed by Anderson³ and in a preliminary study by the present authors.⁴ Recently Brooks, Bradford, and Berry⁵ have reported their findings in a total of 438 nasopharyngeal cultures from 248 cases of pertussis. A somewhat smaller number of cough plate cultures were taken for comparison. Fifty-two per cent of the nasopharyngeal cultures were positive as compared to 37 per cent of the cough plate cultures. In infants under 3 years of age the difference in the results with the two procedures was most marked—32 per cent.

The following report amplifies our previous one and contains some data on the carriage of *Hemophilus pertussis* by familial contacts.

The nasopharyngeal applicator and the technic of insertion have been fully described.^{1, 4} The Bordet-Gengou medium we employed was the same as previously reported⁴ and differed from that of the Rochester workers in that

33 per cent horse blood was added instead of 15 per cent sheep blood. Fresh media were prepared every 2 weeks. It did not appear necessary to pour plates any more often. For both the cough plate and swab cultures, Petri dishes 3½ inches in diameter were used. At least two Petri dishes of medium were inoculated with each swab, and the cough plates were also usually taken in duplicate.

The cultures were obtained by many different physicians and nurses. In more experienced hands better results might be expected.

One or more duplicate tests with nasopharyngeal swabs and cough plates were made in 214 cases of whooping cough. A total of 342 comparative cultures were examined. The results are classified according to the duration of the disease in Table 1.

During the first week 74 cultures were taken. In 32 both plate and swab were positive, in 6 the plate only was positive, in 22 the swab only was positive, and in 14 both cultures were negative. Eighty-one per cent were thus positive by both or either means. It is therefore apparent that the cultural methods available for the diagnosis of pertussis in the catarrhal stage are relatively

TABLE 1

*A Comparison of Results with Cough Plates and Nasopharyngeal Swabs in 342 Tests on 214 Cases in Which Both Cough Plate and Swab Were Used
Classified According to Week of Disease*

| Week of Disease | Both Plate + Swab + | Plate + Swab - | Swab + Plate - | Both Plate - Swab - | Total | Per cent + by Swab | Per cent + by Plate | Per cent + by Both (or Either) |
|-----------------|---------------------|----------------|----------------|---------------------|-------|--------------------|---------------------|--------------------------------|
| 1st | 32 | 6 | 22 | 14 | 74 | 73 | 51 | 81 |
| 2nd | 30 | 10 | 22 | 24 | 86 | 60 | 47 | 72 |
| 3rd | 14 | 8 | 14 | 36 | 72 | 39 | 31 | 50 |
| 4th | 12 | 3 | 8 | 28 | 51 | 39 | 29 | 45 |
| 5th | 1 | 1 | 7 | 19 | 28 | 29 | 7 | 32 |
| 6th | 1 | .. | 2 | 11 | 14 | .. | .. | .. |
| 7th | .. | 1 | .. | 11 | 12 | .. | .. | .. |
| 8th | .. | .. | 1 | 3 | 4 | .. | .. | .. |
| 9th | .. | .. | .. | 1 | 1 | .. | .. | .. |
| Total | 90 | 29 | 76 | 147 | 342 | 49 | 35 | 57 |

+ Positive
- Negative

efficient. This is fortunate as of course the diagnosis can rarely be made clinically until the second or third week of coughing. As Table 1 shows, the cultural tests become less reliable as the cough persists. In every week, however, the percentage of positives obtained by swabs was higher than that obtained by cough plates. This superiority was more noticeable in the first week and after the fourth week.

The results obtained in comparative tests are classified according to the age of the patients in Table 2. As has been

40 per cent positive by cough plate. Rather curiously in the group over 10 years of age the difference in the efficacy of the two procedures was also almost 20 per cent.

When the total number of cases observed is tabulated, rather than the total number of tests, the results of the procedures appear in better light. In Table 3 are listed the results obtained in 225 cases. Sixty-three per cent were positive by swab at some time in their course (though some were not tested until the second month of the disease).

TABLE 2

A Comparison of Results with Cough Plates and Nasopharyngeal Swabs in 282 Duplicate Tests Taken during the First Four Weeks of Cough
Classified According to Age of Patient*

| Age Years | Both Plate + Swab + | Plate + Swab - | Swab + Plate - | Both Plate - Swab - | Total Number Tests | Per cent + by Swab | Per cent + by Plate | Per cent + by Both (or Either) |
|------------|---------------------|----------------|----------------|---------------------|--------------------|--------------------|---------------------|--------------------------------|
| Birth to 2 | 28 | 5 | 24 | 25 | 82 | 63 | 40 | 70 |
| 2 to 4 | 22 | 8 | 12 | 27 | 69 | 49 | 43 | 61 |
| 4 to 6 | 17 | 7 | 9 | 22 | 55 | 47 | 44 | 60 |
| 6 to 10 | 19 | 4 | 14 | 18 | 55 | 60 | 42 | 67 |
| Over 10 | 3 | 3 | 7 | 8 | 21 | 48 | 29 | 62 |

* The figure 282 is one less than the total (283) for the first four weeks shown in Table 1, because the age of the child furnishing one duplicate culture was unknown.

stressed⁵ the nasopharyngeal swab was particularly useful in obtaining cultures from infants. Sixty-three per cent of tests on infants under 2 years of age were positive by swab as compared to

Forty-nine per cent were positive by cough plate. Both of these percentages are of course higher than those shown in Table 1—49 per cent and 35 per cent respectively. The necessity of

TABLE 3

Results of Bacteriological Examinations in 225 Cases of Pertussis
(Many of whom were tested repeatedly though not all or always by both procedures)

| Tested by Swab | | | Tested by Cough Plate | | |
|-----------------|-----------------|-------------------|-----------------------|-----------------|-------------------|
| Number of Cases | Number Positive | Per cent Positive | Number of Cases | Number Positive | Per cent Positive |
| 220 | 139 | 63 | 219 | 107 | 49 |

214 cases tested by both procedures
6 cases tested by swab only
5 cases tested by plate only

repeating negative tests is therefore apparent.

It should be mentioned that the diagnosis of "pertussis" in the cases which yielded negative cultures was made on clinical grounds—typical paroxysms with or without hyperlymphocytosis. There is no doubt that atypical cases were missed by the bacteriologic tests as well as typical ones. About one-fourth of the bacteriologically proven attacks were not typical clinically. The epidemiological importance of atypical attacks of whooping cough was recognized more than 35 years ago by Luttinger.⁶ Kristensen⁷ has described the attacks in 116 children with positive cough plates as being atypical in 40 (35 per cent).

The possibility that some of the bacteriologically negative cases we observed might have been para-pertussis should be mentioned. However, this is not very likely as we are familiar with the cultural characteristics of *Bacillus para-pertussis*.^{8, 9} It grows faster and more luxuriantly on Bordet-Gengou medium than does *H. pertussis* and hence is less likely to be missed if it is considered.

During the course of this study, a period of 2½ years, 5 strains of *B. para-pertussis* were isolated. (The cases are not included in Tables 1–3.) Three of these strains were recovered within a period of 1 month from widely separated parts of San Francisco. Only 2 of the 5 strains came from children with typical clinical whooping cough.

In 3 instances the coughing was less severe, of short duration, and not clinically diagnosed whooping cough. Both nasopharyngeal swabs and cough plates were positive in 2 cases, swabs only were positive in 2 cases, and only the plate positive in 1 case. No positive cultures were obtained after the 14th day of the attack (3 children had stopped coughing by then).

It is our impression that whereas *B. para-pertussis* infections are probably quite common in this community—40 per cent of 50 children with negative histories were found to carry specific agglutinins,¹⁰ this organism probably causes only a small minority of the cases of typical whooping cough. That still other organisms may be occasionally responsible for this syndrome is likely. Brown described a typical case associated with *Bacillus bronchisepticus*,¹¹ apparently communicated from a rabbit with snuffles. Alexander¹² has noted that occasional cases of chronic bronchitis, difficult to distinguish from whooping cough, may be due to infections with *Hemophilus influenzae*. Furthermore, we have occasionally found almost pure cultures of this organism on nasopharyngeal swabs or cough plates. It is not possible to say whether these were cultures of the etiologic agent or of a secondary invader. We did not type the cultures. However, Sinclair¹³ and Alexander¹⁴ have conclusively shown that *H. influenzae* type B is a dangerous respiratory pathogen in infancy. In any evaluation

of the diagnostic procedures under discussion or of the prophylactic effectiveness of *H. pertussis* vaccine, the possibility that apparent failures are due to infections with other organisms than *H. pertussis* must always be borne in mind.

Fifteen familial contacts, without cough or hoarseness, were cultured during the course of this study. The results of these tests are shown in Table 4. Three were contacts to cases of para-pertussis and the remainder to cases of pertussis—all bacteriologically

and Blatt and his coworkers¹⁵ first described asymptomatic contact carriers.

This evidence complements the epidemiologic evidence that healthy carriers exist. Their importance in the epidemiology of pertussis, however, is uncertain. Our carriers were certainly transient carriers and, without cough, they probably disseminated but few organisms. To the writers it would seem that mild and atypical cases, particularly in adults, together with early undiagnosed cases, probably are more important.

TABLE 4

Asymptomatic Familial Contacts to Cases of Pertussis and Para-pertussis

| Name | Age | Culture in Case | Relation to Case | First Cultures | | Repeated Cultures | | | | Notes |
|------|-------|-----------------------|------------------------|----------------|------------------|-------------------|------------------|------|------|-------------------|
| | | | | Swab | Cough Plate * | Swab | Cough Plate * | Swab | Swab | |
| E.S. | 4 w | H. pert. | Sibling | — | .. | — | .. | — | — | Received immune |
| K.D. | 9 w | " | " | — | .. | — | .. | — | — | serum prophylaxis |
| R.L. | 4 y | " | " | — | + | .. | .. | .. | .. | Dev. pertussis 3 |
| R.S. | 14 y | " | " | — | + | — | — | .. | .. | days later |
| B. | adult | " | mother | — | .. | .. | .. | .. | .. | Never coughed |
| W. | " | " | " | — | .. | .. | .. | .. | .. | " " |
| Sa | " | " | " | — | .. | .. | .. | .. | .. | " " |
| Mc | " | " | " | — | .. | — | .. | .. | .. | " " |
| K | " | " | " | + | .. | — | + | — | .. | " " |
| C | " | " | " | — | .. | .. | .. | .. | .. | " " |
| H | " | " | " | — | .. | .. | .. | .. | .. | " " |
| Hol | " | " | " | — | — | .. | .. | .. | .. | " " |
| D R | 10 y | B. para. | sibling | — | .. | .. | .. | .. | .. | " " |
| R | adult | " | mother | .. | — | .. | .. | .. | .. | " " |
| L.S. | " | " | " | .. | — | .. | .. | .. | .. | " " |

* Coughs were induced by placing swab in nasopharynx

H. pert. = *H. pertussis*

B. para. = *B. para-pertussis*

proven. Two were infant siblings of children with pertussis and were injected with immune pertussis sera with prophylactic intent. Neither infant developed a cough and 4 repeated swabs on each child yielded negative cultures. Of the remaining 10 uninjected familial contacts to pertussis, *H. pertussis* was isolated by induced cough or by swab from 3. One of these 3 carriers was incubating the disease as he began to cough 3 days later. Kristensen⁷ has described 9 similar incubatory carriers,

Isolation of the typical cases, undiagnosed until paroxysms have appeared, is certainly of limited value. The more widespread use of bacteriologic procedures to identify early cases, atypical cases, and carriers is therefore advocated. Nasopharyngeal swab cultures, more practicable and more productive than cough plates, should be given a trial in public health laboratories.

SUMMARY

Three hundred and forty-two com-

parative tests with nasopharyngeal swab cultures and cough plates were made in 214 cases of whooping cough. In every week of the disease, and in each age group the swabs yielded a higher percentage of cultures positive for *H. pertussis* than did the cough plates. The use of both procedures however was superior to that of the swab alone. Five cases of para-pertussis were encountered during the course of the study. Three carriers of *H. pertussis* were found among 12 familial contacts to pertussis.

The nasopharyngeal swab technic can provide the public health officer with a relatively simple means of detecting early cases, atypical cases, and carriers of *H. pertussis*.

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TUBERCULOSIS, INDUSTRY, AND YOUNG WOMEN

RECENTLY in an inaugural address as President of the National Tuberculosis Association, Dr. Lewis J. Moorman, of Oklahoma City, called attention to the tuberculosis hazards in the present situation where thousands of young women are going into industrial work. Dr. Moorman's address was scholarly rather than dramatic, and consequently did not catch the attention of the newspapers. He is, however, a sane and competent authority in the tuberculosis field and his anxiety as to what may happen is one which all public health workers should share, and share sufficiently to institute every possible measure for prevention and control in the situation which exists.

If one studies a graph which sets forth age-specific death rates for tuberculosis, it is noted that following a low mortality point in the age group 5-14 years, there is a steady rise in the death rate with each succeeding decade, so that in ages 65-74 years in 1940 in the United States the death rate from tuberculosis was 81 per 100,000 population as against 38 in the 15-24 age group, and 56 in ages 25-34. Assuming equal completeness and accuracy of reporting in the age groups concerned, one is justified in saying that in any given 10 year period, an individual 65 years of age is much more likely to die of tuberculosis than would be the case with one in his early 20's. This knowledge is exceedingly important from an epidemiological standpoint. It has made public health workers realize that elderly persons not infrequently serve as foci of tuberculous infection, and it has given a new insight into the natural history of the disease. At the same time, however, a consciousness that the highest tuberculosis death rate is in the elderly has tended to blur the fact that, because there are so many more younger people than there are older ones, a low tuberculosis death rate in young adults will produce a much greater number of deaths than a high tuberculosis rate in persons 65-74 years of age. Thus, although in 1940 the death rate from tuberculosis in persons 65-74 years of age was more than twice that in persons 15-24 years of age, the number of deaths from tuberculosis reported for that year was nearly twice as great in the young as in the old. An even greater number of deaths from tuberculosis in 1940 was in the 25-34 age group. So strong is the force of mortality from tuberculosis among comparatively young

persons that although, in the mass, tuberculosis ranks about seventh in a list of mortality from all causes, it is the leading cause of death in persons from 15 to 34 years of age.

It should be borne in mind, too, that the mortality curve in females reaches its high point (except for very elderly females) much earlier than is the case with males. The curve for the latter rises fairly evenly with age; the curve for the former climbs rather abruptly and tends to remain somewhat horizontal. Out of the fields of general physiology and pathology there have come bits of knowledge which throw some light on this sex differential, and it is a matter which deserves continuing scientific study. But one need not wait upon an explanation to appreciate the fact that young women offer a higher tuberculosis risk than young men; nor need one wait upon additional knowledge when it is already evident that the industrial worker in general has a higher tuberculosis mortality rate than has the white collar group. Today and now, the facts to face are that war's necessities are pushing one high rate group into the working and living conditions of another high rate group; and unless every possible precaution is taken, the complex and diverse factors which contribute to the high rates in these respective groups may act and react upon each other to the jeopardy of the human beings concerned. Obviously, the situation has within it all the elements of an epidemic (or high endemic) potential.

Although the tuberculosis hazard in industry, to the young and especially to young women, is recognized by the U. S. Public Health Service, by the National Tuberculosis Association, by various state and local health departments, and by many others concerned, it is not at all appreciated by young women. Actually, girls going into industry tend to believe that they acquire ruggedness by virtue of donning pants and getting their faces dirty. This attitude calls for sound and far-reaching instruction as to diet, rest, the danger of time-and-a-half and double time. It calls, too, for properly managed plant cafeterias and proper plant ventilation, for good public health nursing in the industrial community, for sound medical advice. In fact, it demands all those measures included in a good industrial hygiene program, including careful preplacement examinations and periodic x-ray surveys.

Tuberculosis has been present for so long and people are so accustomed to it, that the interest of the public and of many public health workers is in danger of being sidetracked to more glamorous and exciting problems. This is a serious deterrent to accomplishment in this field. Further, the decline in tuberculosis, both in morbidity and mortality, in the last 40 years, may lead some to think that the problem is one of the past. Let there be no mistake in this direction. Tuberculosis continues to be a real problem. If, instead of comparing the tuberculosis rate of today with what it was 50 years ago, one will compare the tuberculosis prevalence and mortality of today with today's prevalence and mortality of other diseases, the present seriousness of the tuberculosis problem can be appreciated: In the most productive period of life, tuberculosis continues to cause more deaths than any other one disease.

TERMINOLOGY IN HUMAN MALARIA

IT is generally accepted that human beings are subject to infection by three, perhaps four, species of malarial organisms. These are *Plasmodium vivax*, *P. malariae*, and *P. falciparum*, with *P. ovale* somewhat recently described as

a separate species. Further, the diagnosis and epidemiology of these different types of infection have been fairly well worked out and current research gives promise of sound advances in treatment and control. However, in the matter of terminology there still exists rather a distressing lack of uniformity, disturbing to those particularly interested in malaria and probably confusing to medical students and casual readers of texts, monographs, and papers on this subject.

This lack of uniformity in terminology of malaria probably arises because the disease is an old one and the development of knowledge has been piecemeal. One of the earliest clinical designations was in relation to the continuity or lack of continuity of fever, and to express these differences one finds, particularly in the older literature, reference to *intermittent* and *remittent* malaria. Similarly, clinicians have used terms to indicate the severity of a given case of malaria, as *benign*, *malignant*, and *pernicious malaria*. Attempts have been made too to suggest certain aspects of a given illness in terms of some outstanding symptom, as *cerebral malaria*, *hemorrhagic malaria*. This sort of terminology has always been frowned upon by those interested in precise nomenclature, and has nothing to commend it.

Perhaps the terminology in most common usage relates to the periodicity of paroxysms, as *tertian*, *quartan*, and *quotidian* malaria. This method of designating the various forms of malaria is as old as Hippocrates and has the advantage of wide acceptance. It is not, however, satisfactory for, while malaria caused by *P. malariae* usually manifests quartan periodicity, frequency of paroxysms may not in all instances be correlated with a particular type of malarial organism. To complicate the matter further, the term *subtertian malaria* has been developed. This connotes a type of malaria with a tendency toward every-other-day paroxysms but with some divergence from that periodicity. As ordinarily employed, it indicates a falciparum infection. This is a particularly unfortunate term, especially where, in a given paper, one finds *malignant tertian* and *subtertian* used synonymously in the same paragraph. Some of the outstanding authorities on malaria are guilty of such usage and juxtaposition. Disturbing, too, is the fact that many who ought to know better speak of *tertian*, *subtertian*, and *quartan organisms*. This, of course, is inexcusable.

Another term not infrequently found in clinical texts and in the older writings is *estivoautumnal malaria*, or *estivoautumnal organism*. This again refers to the falciparum type. It bears no relation to etiologic, pathologic, or even symptomatologic terminology, but arises mainly because in many areas the environmental conditions necessary for the development of this type of infection tend to occur most often in the late summer and early autumn. Finally one encounters a terminology built upon an etiologic basis. Out of this come the designations *vivax malaria*, *falciparum malaria*, and *malariae malaria*. Dr. Mark Boyd, at the Philadelphia meeting of the American Association for the Advancement of Science (December 30, 1940-January 1, 1941), recommended that, for precision, human infections be designated by the name of the causative parasite, but suggested that for euphony the term *quartan malaria* be substituted for *malariae malaria*. Another authority which would substitute etiological designation for terminology now in current use, is the 1942 Edition of the *Standard Nomenclature of Diseases*. *The International List of Causes of Death*, however, adheres to clinical designations and would have all deaths from malaria reported as either benign tertian, quartan, tropical (malignant) tertian, or "other or unspecified malaria." Strange to say, the *International List*, in the index, does not even

carry the terms *falciparum*, *vivax*, or *malariae*; and stranger still, indicates *subtertian malaria* as properly reportable under *benign tertian*.

Inasmuch as malaria is one of the important, perhaps the most important of the tropical and subtropical diseases and, in view of the fact that we shall in the future be learning more of it, if not suffering more from it, it is highly desirable that there be adherence to uniform and consistent nomenclature. It would seem sensible that all individuals and agencies bend their efforts toward adoption of the etiological terminology. Unless one does this, precision is out of the question; and although it is recognized that *malariae malaria* is a clumsy term, we should not be inclined to sacrifice consistency to euphony. Fortunately, it is not a term that will have to be used very often, and, at that, it is not nearly so clumsy as *Rickettsia prowazeki prowazeki* or *Rattus rattus rattus*, both of which manage to find their way into print if not into decent conversation.

As an editorial policy, the JOURNAL will in the future attempt to be consistent in this matter and, so far as nomenclature is concerned, will bluepencil all terms not in conformity with a terminology based upon etiology.

THE Editor has just received from the Surgeon General of the U. S. Public Health Service a very welcome communication bearing upon the recently held United Nations' Conference on Food and Agriculture. This summary, the Surgeon General tells us, was prepared at his suggestion by Dr. William H. Sebrell. Believing that JOURNAL readers will be interested in this analysis and interpretation of the Food Conference by an outstanding authority in the field of nutrition, the communication is published below. The caption was chosen by Dr. Sebrell, and because of its significance, is included.

THE MARRIAGE OF PUBLIC HEALTH AND AGRICULTURE

A new and higher level of health for all mankind is the hope which springs from the United Nations Conference on Food and Agriculture held at Hot Springs, Va., May 18 to June 3, 1943. The Conference declared its conviction that this hope can be realized through improved nutrition, and recommended that every nation accept as a prime obligation the adaptation of its national and international policies to this end.

The growing recognition of the prime importance of nutrition in health has gone hand in hand with the development of the science of nutrition. Practically all of what may be called the modern knowledge of nutrition has developed during the present century

and much of it since World War I. The discovery of the many vitamins, recognition of the great physiological importance of the various mineral salts, and the development and use of better methods for the diagnosis of deficiencies have made the entire world increasingly aware of the enormous amount of ill health, poor development, suffering, disease, and death due either directly or indirectly to malnutrition.

International attention was first focused on the problem by the activities of the League of Nations beginning in 1925, culminating in the reports of the "Technical Commission on Nutrition" and the "Mixed Commission" on nutrition in 1937. Ever since that date, nutritional knowledge has advanced so

rapidly that in 1942 our own Food and Nutrition Board of the National Research Council was able to draw up a new and more complete set of recommended dietary allowances for optimum nutrition. Several world prominent physicians and scientists in the field of nutrition participated in the Conference, and data presented brought out that, measured by the National Research Council yardstick, much of the world's population is subsisting on inadequate food, and that, in terms of adequate food for everyone, not only has no real food surplus ever existed but the world has never had enough to eat.

The Conference stressed the importance of full collaboration between agricultural and health authorities indicating that the latter must play a prominent part in the guidance of the program for better nutrition.

The revolutionary ideal which met with unanimous acceptance at the Conference was that it is one of the primary responsibilities of the state to see that its population has an opportunity to obtain a food supply adequate for health, and that agricultural policies both national and international must be directed toward this end. Recognizing that the immediate attainment of such a goal is out of the question for most nations, it was proposed that each of the 44 nations represented should immediately initiate nutrition programs designed to bring about pro-

gressive improvement in national diets, giving special attention to the nutrition of the most vulnerable groups in the population such as low income groups, infants and pregnant and nursing mothers. To attain these goals, national nutrition organizations were recommended for each country. In order to attack the problem effectively, it was pointed out that in addition to dietary survey data, health and medical surveys are necessary, using the newer clinical and laboratory methods both for assessing the state of nutrition and determining the prevalence of gross deficiency diseases.

In addition to such national activities, an international interim commission was recommended to be followed by a permanent organization for the purpose of collecting and disseminating research data and statistical information and for giving technical assistance where requested. Basic considerations necessary for the success of these plans but beyond the scope of the Conference are guarantees of peace and national security which have greatly influenced agricultural policy in the past.

It is obvious that if the world's agriculture can be based on freedom from want of food for all peoples in all lands, we can have an era not only of economic prosperity but also of health prosperity such as the world has never seen. The success of the deliberations of the United Nations Conference is a first step on this new pathway.

REPORTS OF COMMITTEES

The By-Laws of the American Public Health Association provide that no standards shall be promulgated as the official and authorized judgment of the Association except with the approval of the Governing Council. Except where specifically noted to the contrary, the following reports are in the nature of progress reports from committees, most of which have had Section approval, but which have not been presented for Governing Council action, and therefore are not to be interpreted as standards approved by the American Public Health Association.

Pneumoconiosis

Industrial Hygiene Section

ALTHOUGH the silicosis problem is not now attracting the attention it received a few years ago, its control and the control of dust in industry are still live subjects. According to a recent issue of the Ohio Industrial Commission *Monitor*,¹ occupational disease experience in Ohio continues to show a substantial increase in compensation claim cost, and revision upward in the occupational disease rates has been required in 76 industries. This upward revision is particularly pronounced in industries where dust diseases are prevalent.

In view of the possibility of increased incidence of dust diseases among coal miners as a result of accelerated production to supply expanding industrial requirements for coal, the recent publication by the British Government of the Medical Research Council's report² dealing with conditions in the South Wales coal fields is of considerable interest, as it calls attention to the pneumoconiosis hazard among soft-coal miners. There has been much controversy in England regarding the pulmonary condition found among the South Wales coal miners; some investi-

gators claim that the condition is not silicosis. The definition of silicosis (based on the classification adopted at the International Conference on Silicosis in 1930) as applied to compensation schemes in Great Britain at present is "fibrosis of the lungs due to silica dust." This standard of diagnosis requires for compensation pulmonary disability and definite nodulation or consolidation as revealed by x-ray examination. According to the Council's report, strict adherence to this definition has prevented the compensation of bituminous-coal miners suffering from disabling pulmonary disease, apparently of occupational origin. The Committee on Industrial Pulmonary Disease that made the medical study in the South Wales coal fields stated that, although there are certain distinctions between the pulmonary abnormality found typically in colliers and that found typically in hard-heading workers, it is impracticable to differentiate between them in routine work. Much importance is given in the report to pulmonary changes that up to the present have not been considered a cause of disablement. On the basis of the x-ray

COMMITTEE ON PNEUMOCONIOSIS

Published reports: *Year Books* 1931-1932, 1932-1933, 1933-1934, 1935-1936, 1941-1942.

findings, the cases were grouped as (1) normal, (2) reticulation, and (3) consolidation, subdivided into nodulation and more advanced stages. According to the investigators, as regards associated frequency and degree of respiratory disability, "reticulation" occupies a position intermediate between normal and consolidation, not much below the nodulation subsection of the latter, but much below the more advanced stages of consolidation. The report stated that—

Reticulation appears to indicate a condition of the lungs which may cause respiratory disability, but this occurs mainly in middle-aged and older men. As a corollary, a fairly considerable proportion of men showing reticulation will have no detectable disability—as will also some men with nodulation. In fact, only in the men with most advanced changes is there full agreement between the x-ray changes and the clinical evidence of disability.

The recommendations of the committee include the following:

1. New terminology. "Pneumokoniosis in coal workers"—this to include reticulation even in the absence of other x-ray changes, and to cover all coal workers, whether on the surface or underground.

2. Existing criteria of diagnosis to remain:
 - (a) Positive x-ray findings of a definite character;
 - (b) Presence of disability.

3. A warning against neglect of hard headings and mention of certain preventive measures. The main aim must be to reduce dust created at the coal face.

4. Initial and periodic examination considered desirable.

In summing up the report of the Silicosis Research Committee, Dr. T. W. David of the Amalgamated Anthracite Collieries stated:

The industry is now faced with pneumokoniosis affecting large numbers of workmen, many of whom in the later decades of life may be materially disabled by cough and shortness of breath. It is proposed to make this condition compensatable. The effect of this will be, particularly when collieries shut down, that claims to compensation will be

greatly increased and that many cases will be included for compensation when any disablement, possibly only doubtfully due to the lung condition, can be put forward. Regulation regarding environmental conditions, possibly methods of mining, and certainly dust suppression, will be put forward, adding materially to the present arduous task of the colliery manager.

A system of initial and periodic medical examination will be an essential development and a high standard of physical fitness should be demanded. One highly desirable effect will be the exclusion of infective cases from the mines. Apart from its necessary impact on the question of labour supply, this measure will create a large social problem. Firstly, there will be the problem of treatment of disabled workmen, particularly in those cases where there is an element of infection. Secondly, there will be the vast problem of providing employment for suspended workers with little or no disability. At first the number of these is likely to be large, and provision for them will demand considerable effort and organisation.

It can be seen, then, that the difficulties which will be raised by pneumokoniosis in coal workers are likely to be great and varied, and their solution will demand action on a scale which will be beyond the resources of the industry itself.

Studies made in an anthracite and two bituminous-coal mines in the same district in Russia³ yielded results somewhat similar to those obtained in the South Wales coal fields and in the United States. According to the Russian studies, miners in the anthracite mines were affected by more serious forms of pneumoconiosis, that limited their working capacity, than were miners in bituminous-coal mines. The limitation of working capacity among anthracite miners was determined mainly by emphysema and myocardial damage. One of the main points of interest in the results of the Russian investigation was the contrast in incidence of pneumoconiosis between the anthracite and bituminous miners examined from the same region. After reviewing the many and very variable factors in the Don collieries that might affect the recorded amount of pneumoconiosis at

a particular mine—the method of mining, the geological and hygienic features and concentration of dusts in a mine, the length of employment of the men, and the departure from the mine of the unfit—the investigators concluded that the contrast in incidence is genuine, and that pneumoconiosis, as an occupational disease, is to be particularly considered in connection with anthracite mines; such mines therefore require radical measures for the reduction of dust. One of the causes of the difference in reaction of the two types of miners is thought to be the physical properties of anthracite dust, which has a more noxious effect on the lungs than the dust from bituminous coal; the work of several Russian authors is quoted in support of this suggestion.

In the anthracite colliery investigated, pneumoconiosis was found in 11.1 per cent of the men, while in the two bituminous collieries the incidence was 3.3 and 2.3 per cent, respectively. Comparing one mine with another by periods of service, there was little difference in the younger employment groups; in men of more than 20 years service, however, an excess was evident in frequency and in degree of pneumoconiosis in the anthracite mine over the two bituminous mines; the percentage affected in this employment group in the anthracite mine was 27.1 and in the two bituminous-coal mines 13.5 and 11.0 per cent, respectively.

Although comparison of data obtained under conditions that probably are not comparable is of questionable value, the apparently rather close agreement of the figures showing the occurrence of silicosis or anthracosilicosis in certain coal fields of Russia, England, and the United States is interesting. According to the studies in a Pennsylvania anthracite mine, 23 per cent of the miners examined were affected by anthracosilicosis.⁴ In anthracite mines in the South Wales coal fields,⁵ 18.7

per cent were affected, while the figure obtained in Russia was 11.1 per cent. Silicosis was not found in the South Wales coal fields among bituminous-coal miners who had worked fewer than 10 years in the mines. In those who had worked 10 to 20 years the incidence was 3.5 per cent, and in those who had worked more than 20 years it was 3.2 per cent. The incidence in the anthracite mines was 3.9 per cent for those employed fewer than 10 years, 18.6 per cent for those employed 10 to 20 years, and 29.0 per cent for those who had worked more than 20 years. The percentage for all the bituminous-coal miners examined in Utah was 3.2 per cent, while for underground workers it was 4.6 per cent. Anthracosilicosis was not found among Utah bituminous-coal miners who had worked fewer than 10 years; however, the incidence of the disease rose from 1.7 per cent for those employed 10 to 19 years and 5.1 per cent for those employed 20 to 29 years, to 22.5 per cent for those employed 30 or more years. The incidence of anthracosilicosis for the anthracite mines of Pennsylvania cannot be compared with that for the South Wales mines, as data for the former are grouped according to amount (dust concentration) as well as period of exposure.

Another interesting report of pneumoconiosis among coal miners, by Dr. R. Harold Jones of Fairmont, W. Va., was published recently in the *Journal of the American Medical Association*. Dr. Jones stated⁶ that several years ago he and his colleagues were impressed with the number of soft-coal miners who presented themselves at the Laird Memorial Hospital with a major or a minor symptom of chronic cough or dyspnea, usually referred to by the patient as "miners' asthma." Dr. Jones and his colleagues became interested in these cases and obtained a careful history, especially with regard to indus-

trial aspects. During a 4 year period, 86 cases of silicosis were discovered in which silicotic changes were present in varying degrees. Only those cases with exposure to dust in bituminous-coal mines alone are discussed in Dr. Jones's report. He stated that in this study he had attempted to show that silicosis in soft-coal miners is not a rare disease, that "miners' asthma" and anthracosilicosis are one and the same, and that the entity can be detected by searching clinical study of persons employed as underground workers in the mining and preparation of bituminous coal. Although it has been demonstrated that the greater number of cases occur in the decades from 40 to 60 years of age, and that most of those disabled by anthracosilicosis are in this span, four men in the next younger decade (30 to 39 years) were disabled. All of those in the disabled group had spent a large part of their mining life as drillers, motor runners, coal shooters, or machine men. These occupations appear to be the most hazardous from the viewpoint of exposure to siliceous dust, to the extent of causing disability. He concluded that disability is not necessarily proportionate to the total number of years employed in the mining industry but depends more on the occupation. However, a lesser but definite degree of anthracosilicosis does occur, although not to a disabling extent, in loaders and other underground workers after long years of employment.

Post-mortem studies revealed two types of pneumoconiosis in soft-coal miners—the normal deeply pigmented lung, with definite changes of associated silicosis resulting from long years of exposure to bituminous-coal dust containing silica, and advanced conglomerate pulmonary silicosis with a minimum of anthracotic pigment.

The following statement by Dr. Jones would seem to indicate that considerable work remains to be done on the

subject of pneumoconiosis and that a profitable field for investigation might be the bituminous-coal mines of the United States:

Unfortunately, little work has been done on group surveys of underground workers in the bituminous-coal industry. Before a definite impression can be had as to the real incidence of silicosis and anthracosilicosis in these workers, systematic studies of large groups in the soft coal fields will have to be carried out. At the same time, information regarding dust hazards as determined by thorough engineering surveys is almost completely lacking. Before worth while statistics become available showing the actual incidence and degree of silicosis and the hazards due to bituminous-coal dust containing silica in the bituminous-coal industry, thorough industrial engineering and medical surveys in the various fields must be made and the results of the two correlated.

Mention might be made of the apparent tendency to lower somewhat the standards formerly set as a safe concentration for exposure to various types of dust. The tentative standard of 5 million particles per cubic foot of air for dust, irrespective of its silica content, seems to have been too high according to results of some more recent studies. In a discussion at the Fourth Saranac Laboratory Symposium on Silicosis, Dr. Gardner⁷ stated that, although the maximum permissible dust concentration in iron mines is 5 m.p. per cu. ft. of air, as the rock contains as much as 50 per cent silica it has been assumed that it would be safer to impose the use of masks than to experiment upon the men with the possibility of producing silicosis after 20 or more years of employment.

From data on the relationship of silicosis to dust concentration obtained from a study of silicosis and lead poisoning among pottery workers, which showed clearly that even moderately severe cases of silicosis occur at relatively low concentrations of dust, the Division of Industrial Hygiene of the National Institute of Health⁸ con-

cluded that if the dust exposure could be brought below 4 m.p. per cu. ft. new cases of silicosis would not develop.

Clifford S. Gibson,⁹ Engineer and Secretary of the Technical Silicosis Research Committee of the Ontario Mining Association, stated recently that the general aim in Ontario is to reduce the dustiness of the air to the lowest possible limit. Although 300 particles per ml. has sometimes been considered a safe limit, the tendency recently has been to reduce this to 200 particles per ml., and it is significant that in an industry with air-borne dust containing up to 29 per cent of quartz, dust control measures installed have reduced dust counts to 50 to 100 particles per ml. around some operations. Such provisions would not have been made if they had not been thought necessary.

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Check Anthrax—A Warning and a Plea*

Industrial Hygiene Section

IN 1938 we brought the review of the literature on anthrax up to date. In 1939 we presented a "Twenty Year Survey of Anthrax in the United States," which embraced all the previous statistical reports we had made and covered the experience in this country for the period 1919-1938. We hope to make a 5 year report for comparison in 1944. It is being brought to our attention that there is an alarming increase in anthrax in this country, particularly in the wool industry, and last year we made a brief report on the experience of Philadelphia as indicative of that of the rest of the country, particularly in those places where wool industries are located. We brought to

years prior to that time, mentioning 7 cases in one mill in 3 months. Because of the increasing seriousness of this situation and the excellent coöperation of Dr. P. F. Lucchesi, Acting Chief of the Division of Communicable Diseases of the Philadelphia Department of Public Health and Superintendent of the Philadelphia Hospital for Contagious Diseases, in supplying complete and reliable statistics for the City of Philadelphia, we have felt it advisable again very briefly but emphatically to call your attention to the status of this problem in the city as an indication of the larger problem we are facing in the country as a whole.

Table 1 illustrates this trend.

TABLE 1
Anthrax Cases in Philadelphia by Sources of Infection

| Period | Total Cases | Goat Skins | Goat Hair | Horse Hair | Wool | Wool and Hair | Fur Pelts | Other |
|--------------------------|-------------|-------------|-----------|------------|------------|---------------|-----------|-------|
| 10 yrs., 1929-1938 | 58 | 28 (48.3%) | 7 | .. | 15 (25.9%) | 5 | .. | 3 |
| 3½ yrs., 1939-Aug., 1942 | 59 | 12* (20.3%) | 6 | 3 | 29 (49.1%) | 7 | 1 | 1 |
| 1939 | 10 | 3 | .. | 1 | 5 | 1 | .. | .. |
| 1940 | 12 | .. | 4 | .. | 6 | 1 | .. | 1 |
| 1941—8 mos. | 11 | 3 | 1 | .. | 5 | 1 | 1 | .. |
| " 4 " | 11 | 1 | 1 | .. | 7 | 2 | .. | .. |
| 1942—8 mos. | 15 | 5* | .. | 2 | 6 | 2 | .. | .. |

* 1 case traced to sheep skin

your attention at that time the concern of the States of New York, New Jersey, and Pennsylvania regarding this situation. This year we have received a query from the State of New Hampshire, which at the time of our last statistical report had had no cases for 10

It is readily evident from this table that the incidence of anthrax has almost trebled since the beginning of the present war and that it is still increasing. It is also evident that while the number of tannery cases in relation to the total number of cases has *decreased* by more

* Report of the Committee on Industrial Anthrax.
COMMITTEE ON INDUSTRIAL ANTHRAX

Organized 1924. Published reports. *A.J.P.H.* Nov., 1924, Jan., 1926, Feb., 1930, *Year Books* 1934-1935, 1939-1940, 1941-1942. The two most informative reports, while not published, were mimeographed for distribution by the U. S. Public Health Service—reports of Oct., 1938, and Oct., 1939.

than 57 per cent, the number of cases due to wool has *increased* approximately 90 per cent. We have pointed out in many of our past reports that, until England opened her wool-disinfecting station in 1921, wool anthrax in this country was almost negligible (3.2 per cent of the total number of cases for the 5 year period 1919-1923 as compared with 27.2 per cent for the 5 year period 1929-1932), and that the increase was due to the deflection of inferior wools to this country where disinfection charges need not be paid.

The sources from which the infective materials were obtained have been recorded in every case in Philadelphia, at least since 1932. Unfortunately it is extremely difficult, especially in bales of wool or hair, to select specific samples for analysis which actually contain the organism, so that all materials used at the time of onset of the case must be regarded as suspicious. These materials came from widely distributed geographical areas, including South American, African, European and Asiatic countries, and were so hopelessly mixed that no particular source could be singled out as being the point of origin of any given case or group of cases. However, in replies from 49 countries in these continents to questionnaires sent out in 1939, we obtained information showing that both animal and human anthrax were decidedly widespread, and indicating that there might be good reason to suspect almost any of the materials listed. In many of our previous reports, we have pointed out the worthlessness of consular certification to the effect that areas from which such materials are shipped are free of anthrax. In peacetime the skin or wool from one animal in a whole bale might be infected while in wartime, as happened in the last war, materials which cannot readily be moved remain piled on docks, become

soaked, and eventually permeated with anthrax from the one skin or fleece, thus increasing many fold the possibility of the final handler's becoming infected from the single originally infected animal. Undoubtedly the longer the war continues and the longer the elapsed time between the death of animals and the importation of their products to this country, the greater will become the increase in wool anthrax. This holds equally true of goat skins, but the reduction in tannery anthrax during this period might well be due to the reduced use of goat skins for fancy shoes, and the increased use of packer-killed-cattle hides for the more durable shoes. We may very well expect that, with the close of war and a return to greater use of imported goat skins in the tanneries—skins which have been long in reaching their ultimate destination—we shall again see an increase in tannery anthrax as well as in wool anthrax.

In our 1939 report we pointed out the definite trend toward increased agricultural anthrax in this country. This does not of course show in our Philadelphia figures and we have not collected figures since that time to show whether this trend is continuing, but you will remember that in each successive 5 year period a greater number of states reported anthrax cases, and that the percentages of agricultural cases to the total number of cases in the four 5 year periods showed a progressive increase—namely 13, 14, 26, and 34 per cent.

It is regrettable that with such a situation so few of our state departments of health take an active enough interest to collect complete information on all such cases or to act in preventing a further increase. It is still more regrettable that the U. S. Public Health Service has ceased to make anthrax in this country reportable to them. That

action in itself has given state authorities and others the impression that it is no longer of sufficient importance to be considered. While it is true that the total number of cases and deaths in any one year from this cause is small compared with that from some other conditions, it is also true that it can become a much greater menace if not checked. Although our present incidence in Philadelphia is less than 2 per 100,000 population, that for Chile, for instance, in 1938 was 12 per 100,000 population, with a fatality which had increased from 6 per cent in 1920-1924 to over 20 per cent in 1938. And we have sufficient evidence from early times that it is not impossible for this malady to assume the proportions of a plague. By way of comparison, taking figures at random from the *U. S. Public Health Reports* for September 4, 1942, the average 1937-1941 incidence for both diphtheria and typhoid-paratyphoid in the 89 registration cities was slightly over 9 per 100,000 population, and Pennsylvania states her poliomyelitis incidence in 1941 to be less than 8 per 100,000 population; yet authorities throughout the country are keenly awake to these hazards and are doing all in their power to keep them down.

We do not want to lose sight of the definite desirability of the establishment of government controlled disinfecting stations, for wool and hair at least, at ports of entry, such as England has so successfully operated. We realize, however, that with the present war emergency we have no hope of immediate action in this direction and that the best we can do for the present is to bring the situation emphatically enough before local health authorities and the industries themselves, so that they will be alert to their own problems and take whatever action they can to check or lessen the anthrax hazard in their own locality. In the case of wool

and hair industries, it is not out of the question to adapt the English method of disinfection in combination with wool scouring, without much additional equipment. One mill in New Hampshire is already preparing to do this experimentally upon our advice. Of course it will add to the expense of wool processing and will not be so kindly received by manufacturers who are not made to realize the hazard involved. But, lacking any satisfactory method of disinfection nearer the source of supply, mills in which cases recur—and there have been 4 of these in Philadelphia alone in the last year—should afford to take this precaution. Wool, as processed at present, can remain infective throughout, as evidenced by cases in handlers of finished products only, so that disinfection as soon as it enters the plant, or before it enters the plant if scoured wool is obtained from elsewhere, should do much to lessen this hazard. Our present methods of so-called disinfection for wool do *not* disinfect, as we have pointed out before.

With the tannery problem it is more difficult to offer specific suggestions, but it is a problem which should be given serious consideration, with enough research being backed by private or government agencies to develop a satisfactory method for skin disinfection which could eventually be applied to government disinfecting stations at ports of entry or, better still, at ports of shipping. As we have said before, no method economically within reason which will adequately disinfect and at the same time completely satisfy the manufacturers' requirements for a tannable skin, has as yet been developed. The Schattenfroth method is fairly adequate and has been found satisfactory to some Europeans, but it is rather expensive, and some of our American tanners complain of its effect on the

skins. The Lehmann method is adequate and satisfactory only if the skins are tanned at once, since it softens them too much if they are left for some time before being tanned. Our experimental iodine disinfection, when tried out on a semi-plant scale, did not prove satisfactory without the addition of potassium iodide, or unless the iodine was in colloidal form, which makes this method entirely out of the question financially. And of course, as we have so often previously stated, the government recommended lime-soak and bichloride methods are entirely inadequate.

While the solutions of the problems of wool and tannery anthrax are primarily in the hands of state and federal health and labor agencies, that of agricultural anthrax is more in the hands of the U. S. Bureau of Animal Industry and state departments of agriculture, who, as often happens, are more awake to the problems of saving animals from this hazard than our health authorities are to that of saving human beings. The weapons of attack here are greater insistence upon prophylactic inoculations of herds and flocks in areas where the disease has been known to exist, and not only increased activities in insisting upon proper disposal of carcasses of animals dying of anthrax, but particularly education of farmers, sheep men, and cattle handlers, in recognizing such carcasses so that they will not autopsy them to deter-

mine the cause of death, as has so often happened.

Just a word concerning the treatment of cases once they have developed. Of the 26 cases treated in Philadelphia in the 12 month period, September, 1941, through August, 1942, 17 received serum alone or in combination with other treatment, and 19 received neoarsphenamine alone or in combination with other treatment. We mentioned last year that we had no record of any fatality in this country in an anthrax patient treated with neoarsphenamine. The first exception to this statement has occurred this year in Philadelphia with 2 fatalities, one of which, however, was a pulmonary case which had been treated for 2 weeks as a pneumonia patient before an anthrax diagnosis had been made and serum and neoarsphenamine administered. We are coming more and more to feel that neoarsphenamine is the treatment of choice, especially since it can always be readily available.

In closing, I wish to make a strong plea that we do whatever may be in our power to awaken authorities to our increasing anthrax hazard, and to stimulate them into sufficient interest and activity to check this hazard now, before it approaches the major hazard class.

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Ventilation and Atmospheric Pollution

Industrial Hygiene Section

Part I

Suggested Standards

THE committee's Suggested Standards were adopted as so-called "Working Standards" by the Section on Industrial Hygiene at the Milwaukee Meeting, 1935. They have been reprinted since that date in the *Annual Year Books* (with the exception of 1939-1940, when they were cited), and with only slight changes.

No changes have been made in the subjoined list of 15 items for Suggested Standards as published in the *Year Book* 1941-1942. However, considerable thought has been given to item 6 with the suggestion that it might read as follows, for which comments are invited:

"Surrounding surface temperatures (e.g., floor, wall, ceiling) a few degrees higher than air temperature during the heating season, and, except floor temperature, a few degrees lower than air temperature during the cooling season, wherever this can be obtained economically."

A two-season system composed of surface positive radiations during the heating season, and cooling ventilation only (that is, without purposeful radiation) during the cooling season, is a second suggestion. Third, simply a warmed floor during the winter and

cooled air during the summer might prove practical in many situations. Nothing should imply substitution of radiant methods for the present convection methods, except that a moderate amount of seasonal radiation is desirable wherever it can be obtained economically.

Outline of working standards for atmospheric and space environments for the maintenance of comfort, health, and efficiency, assuming altitudes not exceeding 10,000 ft. above sea level*:

1. Cool rather than hot †—but avoiding a sense of chilliness.
2. Dry rather than damp.†
3. Still ‡ or moving, depending upon physical activity.†
4. Some diversity in temperature—time and space—rather than uniformity and monotony.†
5. Foot level as warm as head level.
6. Radiant, i.e., local heat source as an item in heating, preferred.

* Agreements as to the majority of the exact specifications, of interest to engineers, and correlation with A.S.H.V.E. standards were summarized in the report of this Committee (*Year Book*, A.P.H.A., 1934-1935, pp. 108-112).

† Adapted from the British Health of Munition Workers' Committee, Memorandum No. 9, 1916.

‡ "Still" implies air motion under 25 ft. per minute.

7. Shockless temperature differentials between air conditioned quarters and outer air, depending upon the length of stay indoors, *i.e.*, less differential for brief stays.

8. Essentially noiseless conditioning apparatus.

9. Allotments for floor area, air space, and air supply should be sufficient to fulfil physical, physiologic, epidemiologic, and psychologic requirements of the occupants in any given enclosure.

10. Reduction of obnoxious dusts, bacteria, fumes, vapors, and gases to their sub-danger thresholds.

11. Satisfactory primary sense impression upon entering the room or space.

12. Maintenance of comfortable conditions during occupancy (room comfort impression).

13. Sufficient replacement of "foul air" with "fresh air" to meet odor-comfort requirements. Entrainment or filtering out of objectionable industrial odors.

14. Ultra-violet or actinic ray effects on air or occupied space to be deferred for later consideration.

15. Intelligent supervision.

The items of compressed and rarefied air are not considered here.

The Committee desires to call attention to *Report No. 76* of the Medical Research Council (Industrial Health Research Board), London, 1936, 109 pp., entitled, "The Warmth Factor in Comfort at Work. A Physiological Study of Heating and Ventilation, by T. Bedford. (Note especially "Equivalent Conditions of Warmth"—discussion of Scale with Chart—pp. 50-56 of this *Report*.)

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The following paper by Professor Yaglou was presented at the St. Louis Meeting at the special request of the committee.

Defense Ventilation and Air Conditioning Problems

VENTILATION and air conditioning are contributing an important part in production for national defense. The necessity for uninterrupted production under conditions of blackout has led to the design of windowless "blackout plants" for airplane factories, munition plants, and for other key defense industries.

These plants are huge single-story buildings with few or no interior partitions. Raw materials go in at one end and finished products come out at the other. Except in cold weather, much artificial cooling is required to remove excessive heat from furnaces, machinery, and solar radiation. Aside from human comfort requirements, temperature control is essential to insure precision of finished parts for air-

planes, tanks, instruments, etc. Controlled humidity is often necessary to prevent rusting of highly finished parts; to maintain uniform regain in the manufacture of powder, and in the loading of fuses and shells; and to avoid generation of static sparks.

An undesirable feature in the design of some blackout plants is the lack of segregation of clean from the toxic process. Air pollution may be particularly aggravated in warm weather when the outside air supply is normally reduced to about one air change per hour in the interest of economy.

For small workshops and factories that are ventilated by natural methods, several types of blackout ventilators have been developed which obscure the outward passage of light without ob-

structing air flow too much. Some of these are equipped with a fan and are suitable for attachment to roofs or side walls.

Another interesting application of air conditioning is in blast furnaces of steel plants. It has long been known that removal of water vapor from the air supplied to blast furnaces increases their capacity, yields a more uniform product in silicon and sulfur content and reduces coke consumption. During periods of overproduction, manufacturers have shown little interest in this possibility, but with the present crisis in steel production there is considerable incentive.

The primary object of air conditioning is to dry the air blast and preheat it to about 1,300° F. The saving of fuel results from reducing heat wasted in dissociating water vapor. For every pound of water dissociated by intense heat, in the presence of reducing agents, 6,850 B.T.U. are absorbed and the waste is greatly reduced by drying the air.

Much more thought is now being given to the ventilation and air conditioning of ships than ever before. Air conditioning of gun turrets aboard fighting ships has speeded up the firing rate by removing powder fumes and keeping the temperature down. Submarines and sick bays of surface ships cruising in tropical waters are now cooled to overcome temperatures of 90 to 95° F. and humidities approaching the saturation point.

Despite official denials, rumors persist that some of the larger German tanks are cooled by refrigeration in the blistering heat of Libya. According to a French publication, refrigeration is accomplished by means of a methyl chloride absorption system utilizing exhaust gas heat for motive power.

Many other war uses could be added, such as the testing of aircraft engines, guns, and pilots in extreme cold, the

drying of foods to save shipping and storage space, the processing and storage of blood plasma, sera and vaccines, manufacture of synthetic rubber, etc.

In the field of industrial toxicology, war production has introduced new occupational hazards, requiring changes of medical procedures and of engineering methods of control. Some of the new chemical and physical irritants used are more toxic than the ones they have replaced.

An important improvement in hood design is the substitution of low resistance exhaust systems for the conventional high resistance systems, resulting in a substantial saving of power and of critical materials.

Among the new developments in air conditioning is the conduits system of ventilation which distributes conditioned air at high velocities through small conduits instead of large ducts. The system requires no more floor area and wall space than the steam pipes of a heating system.

The Public Buildings Administration has developed an inexpensive warm air furnace for low-cost defense houses which have no basements. The furnace has a capacity of 60,000 B.T.U. per hour, and utilizes an electric blower for circulating 600 c.f.m. of air. It is being used by practically all governmental agencies constructing defense houses.

A compact and inexpensive centrifugal air washer is being developed for decontaminating air from chemical war gases and mists by centrifuging and countercurrent washing with chemical solutions. It is intended for use in air raid shelters, trucks, tanks, and dug-outs, as well as in large public enclosures. Using suitable chemicals, it will dehumidify air to a low humidity at a fraction of the cost of present methods.

The War Production Board has re-

cently prohibited the manufacture, sale, and installation of new air conditioning equipment for all uses except where necessary to meet military and essential civilian needs. Another WPB ruling, applying particularly to defense housing, for which critical materials are to be allocated, limits the net hourly output capacity of the heating system to not more than 66 times the dwelling area in square feet or 80,000 B.T.U. per dwelling unit, whichever is the smaller. Government regulation of the maximum heat transfer coefficient of building materials is a step in the right direction even in peacetimes, and has long been in force in Germany and in the Netherlands. In Sweden the use of double windows is compulsory.

Fuel conservation has now become a wartime "must," at least on the Eastern Seaboard. Some medical men believe that compulsory reduction of house temperature to 65° F. may prove beneficial to health, but the majority of workers on the subject expect considerable discomfort and perhaps a few more "colds" until persons adapt themselves to this lower standard. There is no

good evidence to show that a temperature of 65° in the house, office, or school menaces health, but there is much proof that it affects seriously the American standard of comfort.

Discomfort will be greatly alleviated by insulating buildings to keep exposed walls and windows warm, by wearing heavier underclothing, and by stopping drafts from fire places and doors. Fundamentally, the problem of fuel saving is not so much a matter of drastic reduction of indoor temperature as one of insulation and thrift in the use of fuel. In average New England winters, a reduction of indoor temperature from the customary 72° to 65° F. will reduce fuel consumption by not more than 20 per cent, or almost as much as can be saved by weather stripping of windows and exposed doors. Complete house insulation, including wall and roof insulation in addition to weather stripping, may save as much as 60 per cent of fuel, and, by shutting off unused rooms, still greater economy may be expected. FHA loans are available for house insulation and can be paid back out of fuel savings.

C. P. YAGLOU

Part II

Standard Methods for the Examination of Air

THIS committee, organized at the Pasadena Meeting in 1934, and representing the Industrial Hygiene, Engineering, and Laboratory Sections, has reported annually in the *Year Book*, chiefly through its four subcommittees, one of which, that on Chemical Methods, reports this year on the determination of cadmium in air.

As heretofore, comments and suggestions are invited and may be taken up with any member of the committee or

subcommittees, as befits the subject matter.

EMERY R. HAYHURST, M.D., *Chairman*
HARRY B. MELLER (*Engineering Section*)

JOHN F. NORTON, PH.D. (*Laboratory Section*)

PHILIP DRINKER

LEONARD GREENBURG, M.D.

WILLIAM J. McCONNELL, M.D.

CAREY P. McCORD, M.D.

I. Report of Subcommittee on Physical Procedures in Air Analysis

THIS committee directs attention to its report in the *Year Book 1938-1939*, entitled "Instruments and Methods for Recording Thermal Factors Affecting Human Comfort," in which very slight changes were recommended as published in the *Year Book 1939-1940* (page 91).

The committee is digesting the latest advances in the field which it plans to incorporate in a revised report next year.

C. P. YAGLOU, *Chairman*
ALONZO P. KRATZ
C.-E. A. WINSLOW, DR.P.H.

II. Report of Subcommittee on Chemical Methods in Air Analysis Cadmium and Hydrogen Sulfide

THIS year's report includes the determination of cadmium and hydrogen sulfide, two contaminants which are of immediate interest in the war effort.

DETERMINATION OF CADMIUM IN AIR *Occurrence and Method of Collection:*

Cadmium as an air contaminant occurs usually as the oxide in the form of a dust or fume and may be collected in the impinger with water as the medium, or with the electrostatic precipitator.

Cadmium (Cd) has an atomic weight of 112.41, melting point 321° C., boiling point 767° C. Cadmium volatilizes when heated and burns, yielding a fume of brown cadmium oxide (CdO).

The American Standards Association has set the maximum allowable concentration of cadmium or of its compounds at one milligram of cadmium per 10 cubic meters of air (Nov. 2, 1941). The literature cited included the following methods.

Cadmium Sulfide Method

Procedure:

Transfer the sample to a 250 ml.

Phillips beaker and add sufficient nitric acid for the destruction of any organic material which may be present. Add 10 ml. sulfuric acid (1:1) and heat until fumes of sulfur trioxide are freely given off. Dilute to 75 ml. and add 1 ml. of copper sulfate solution (200 mg. $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ in 100 ml. H_2O). Add 2 gm. of sodium citrate. Neutralize the solution with ammonia and adjust the acidity to $\text{pH} = 3$. Pass hydrogen sulfide into the resulting solution for about 10 minutes, add 1 drop of 5 per cent aluminum chloride solution and allow to stand 6 to 12 hours. Filter, dissolve the precipitate in nitric acid and hydrochloric acid and carefully evaporate to dryness. Take up the residue in water, and make up to a convenient volume in a volumetric flask. An aliquot portion of this solution is used in a Nessler tube for the final reading.

Add 5 drops of 10 per cent potassium cyanide to the aliquot in the Nessler tube, 5 ml. of hydrogen sulfide water, and make up to the mark with distilled water. Mix thoroughly and compare under flood of ultra-violet light with

standards similarly prepared. The solution should exhibit a bright clear yellow color under the mercury arc.

A standard cadmium stock solution may be prepared from cadmium metal by dissolving 1 gm. of cadmium in nitric acid and making the solution up to 1 liter in a volumetric flask. Any other suitable cadmium salt, such as the sulfate, may be substituted if cadmium metal is not available.

The sample tubes and the standard tubes should be prepared at the same time as there is a notable deepening of tone when they are allowed to stand overnight. In doubtful cases, however, it is sometimes advantageous to allow the tubes to stand for a few hours before reading. Concentrations of cadmium as low as 0.02 mg./50 ml. may easily be distinguished by this method.

β -Naphthoquinoline Method

This method has been described for quantities of cadmium down to 1 mg.

Procedure:

Dissolve the cadmium by treating the sample with 50 ml. 2 normal sulfuric acid and 50 ml. 10 per cent sodium tartrate solution. Add an excess of a 2.5 per cent solution of β -naphthoquinoline. (Made by dissolving β -naphthoquinoline in N/2 H_2SO_4 .) Precipitate the cadmium by adding a suitable amount of N/5 potassium iodide solution. Total volume about 150 ml.

The precipitate is filtered after 20 minutes, preferably by suction and sucked as dry as possible. It is washed with a solution obtained by adding 10 ml. of N/5 potassium iodide to 10 ml. of sulfuric acid-naphthoquinoline solution diluted with 90 ml. of water. It is best to add an additional 2 or 3 ml. of potassium iodide solution to the first two portions of wash solution in order to be sure of removing any excess acid in the precipitate.

The filter is now washed down with 20 ml. of 2 normal sodium hydroxide or ammonia, acidified with sulfuric acid, making the acid concentration about 5 per cent, and then titrating with N/10 potassium iodate solution. This may be done according to the method of Berg by adding practically an equal volume of acetone and using starch as the indicator.

Calculation:

1 ml. N/10 potassium iodate = 0.9366 mg. cadmium.

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HYDROGEN SULFIDE

Hydrogen sulfide is encountered rather infrequently as an industrial chemical compared to its occurrence as a by-product of some industrial or natural process. It is a very toxic gas and the maximum allowable concentration for exposures not exceeding a total of 8 hours daily has been set at 20 p.p.m. parts of air by volume, by the American Standards Association in January, 1941.

Methods applicable to the detection and estimation of hydrogen sulfide include lead acetate test papers as used by the British Department of Scientific and Industrial Research, the silver cyanide detector developed by the U. S. Bureau of Mines, and the cadmium sulfide method. Other reagents for hydrogen sulfide include iodine, sodium nitroprusside, and p-aminodimethylaniline sulfate. The cadmium sulfide method is practical, accurate, and quite specific. It is recommended as the reference method.

Collection of Sample:

Two simple bubblers such as the petticoat type, in series, containing 10 per cent cadmium chloride solution are

used to collect hydrogen sulfide gas. Ammoniacal cadmium chloride solution or a slightly alkaline cadmium chloride solution may also be used with advantage. A single fritted glass bubbler operating at a rate of 0.5 to 1 liter per minute is also satisfactory, provided that a separate bubbler is used for each sample.

Procedure:

Transfer the contents of the bubbler with rinsings to a 250 ml. Erlenmeyer flask. Add a few ml. of sulfuric acid and titrate with standard iodine solution, using starch as an indicator. The solution may also be back-titrated with sodium thiosulfate after the addition of excess iodine solution. Add 5 ml. of .05 N iodine followed immediately by 2 ml. of acid. After 10 minutes back

titrate with .05 N sodium thiosulfate.

Calculation:

1 ml. N/100 iodine = 0.112 ml. of H_2S at $0^\circ C$. 760 mm. Hg.

An alternate method consists in comparing the amount of cadmium sulfide with standards of known sulfide concentration according to the method for cadmium as outlined above.

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F. H. GOLDMAN, PH.D., *Chairman*
ALLAN A. COLEMAN
HERVEY B. ELKINS
H. H. SCHRENK, PH.D.

III. Report of Subcommittee on Dust Procedures in Air Analysis

THIS committee makes no report for the current year but refers to its previous annual reports in *Year Books* 1936-1937, 1937-1938, and 1940-1941. New developments, provided they can be summarized in the form of a report,

will be forthcoming in later reports by this committee.

J. J. BLOOMFIELD, *Chairman*
THEODORE HATCH
RICHARD T. PAGE
CHARLES R. WILLIAMS

IV. Report of Subcommittee on Bacteriologic Procedures in Air Analysis

THIS committee makes no report for the current year but refers to its six previous annual reports in the *Year Book*. The chairman has prepared a resumé of these six reports, with special reference to air disinfection, which is soon to be published elsewhere and reprints will be available, for which please

address him, care Laboratories for the Study of Air-Borne Infection, The School of Medicine, University of Pennsylvania, Philadelphia.

WILLIAM F. WELLS, *Chairman*
ELIZABETH CHANT ROBERTSON, M.D.
C.-E. A. WINSLOW, DR.P.H.

Duties of Nurses in Industry

Public Health Nursing Section

THE industrial expansion occurring throughout the United States and the increasing understanding of the importance of the health of workers made necessary some consideration of the factors influencing the development of an industrial nursing program. For this reason the Public Health Nursing Section of the American Public Health Association at its 1940 Annual Meeting authorized the appointment of a special committee to be known as the Committee to Study the Duties of Nurses in Industry. This committee became active early in 1941 and planned a nation-wide industrial nursing survey. Such a survey was to serve as the basis (1) for determining the range of nursing activities included in all types of industrial nursing services, (2) for formulating a statement of recommended practices in industrial nursing, and (3) for defining the current problems confronting nurses in industry.

THE PRELIMINARY SURVEY

The committee decided before undertaking a survey on a nation-wide scale to do a preliminary survey. For this purpose a form and accompanying instructions defining the items on the form were prepared. During the summer of 1941 the form was used by committee members in 109 establishments which employed 235 nurses. Whenever possible the general plans for the survey and the practicality of procedures to be followed were discussed with the

industrial nurse being interviewed and with the organized group of industrial nurses in the area, if such a group existed.

The results of the preliminary survey were presented in a progress report to the Public Health Nursing Section at the 1941 Annual Meeting of the American Public Health Association. At this time the Section accepted the several recommendations of the committee. The first recommendation was to continue the survey on a nation-wide scale since the report indicated that such a survey would be of sufficient value to warrant the effort, and the procedures as established seemed to be practical.

The second recommendation provided for the establishment of two committee groups, the Advisory Group, and the Working Group. A third group, the Consultant Group, was decided upon at a later meeting of the committee. The third recommendation authorized the committee to request the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, to guide and direct the survey and to assume the responsibility for the tabulation and analysis of the collected data.

ORGANIZATION OF COMMITTEE GROUPS

The *Advisory Group* was made up of representatives of organized groups of industrial nurses throughout the country. In some areas where the industrial nurses were not organized a

well known industrial nurse was invited by the committee to serve on the Advisory Group.

The functions of the Advisory Group were (1) to assist with the planning for and the conduct of the survey, and (2) to prepare recommendations of acceptable practices of industrial nursing based on the survey findings.

The appointment of the Advisory Group stimulated organizations of local industrial nurses' associations and afforded industrial nurses an excellent opportunity to plan for the development of practices in their own field.

The *Working Group* was composed of nurses on staffs of state health departments. The chief function of this group was the collection of data for the survey. In those states where a nursing consultant for industrial hygiene was employed, she was made responsible for collecting the data. In other states, arrangements were made for the staff of the division of public health nursing to accept this responsibility.

Serving on the Working Group afforded the consultants of the several divisions of industrial hygiene of the respective state departments of health an opportunity to become acquainted with the industrial nurses and the problems relating to industrial nursing in their respective districts. Likewise the nurses on the staff of the divisions of public health nursing who participated in the collection of the data acquired more knowledge of and greater interest in industrial nursing.

The *Consultant Group* was made up of representatives of the Council on Industrial Health of the American Medical Association, the American Association of Industrial Physicians and Surgeons, the American Industrial Hygiene Association, and the National Conference of Governmental Industrial Hygienists. Its function was to advise on all matters pertaining to the survey.

COMMITTEE ACTIVITIES

In general, committee and group activities were carried on through correspondence. However, several meetings were held, the first of which was held in November, 1941, and included members of the Advisory and Working Groups. At this time the form used in the preliminary survey was revised and plans were completed for conducting the survey on a nation-wide scale. Two other meetings were held in April and May, 1942, for the purpose of reviewing the progress made during the first two months of work and discussing problems encountered in collection of the data.

The final meeting of the Advisory Group was held in January, 1943, after the official termination of the activities of the committee as a whole. The group then prepared recommendations on acceptable practices of industrial nursing.

A report of the analysis of the findings of the survey data collected up to October, 1942, was given in a paper read before the Joint Session of the Industrial Hygiene and Food and Nutrition Sections at the 71st Annual Meeting of the American Public Health Association, St. Louis, Mo., October 29, 1942.

By official action of the Public Health Nursing Section, the committee was formally dissolved with the understanding that further study of the data was to be carried on at the National Institute of Health and the final report containing the recommendations to be prepared by the Advisory Group would be published by the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service.

RESULTS OF THE SURVEY AND RECOMMENDATIONS OF THE ADVISORY GROUP

NATURE AND SCOPE OF THE SURVEY

The committee was successful in ob-

taining completed schedules on 924 industrial establishments employing approximately 2,500,000 workers and located in 36 states and the District of Columbia. The information was collected through personal interviews with the plant nurse or other plant official by consultant nurses in the divisions of industrial hygiene, by staff nurses in several state departments of public health nursing, and by committee members. The survey was begun in March, 1942, and continued through December of the same year.

Eighty-four per cent of the plants were engaged in manufacturing and included a large number of essential war industries producing aircraft, ships, machinery, ordnance material, and clothing for the armed forces. Federal as well as private industries producing ordnance material were surveyed. The remaining 16 per cent of the plants were non-manufacturing industries and included coal mines, metal mines, construction projects, department stores, public utilities, insurance companies, banks, and several service industries.

The plants varied widely in size. Over one-half (58 per cent) of the industries with full-time nursing services employed from 500 to 2,500 workers. Sixteen per cent had less than 500 workers and 26 per cent employed more than 2,500 workers.

In general, the aim of the committee was to obtain as much data as possible on industrial establishments maintaining what is known as "nursing service." For this reason three distinct types of nursing service were sampled; namely, in plants in which the nursing activities were carried on by at least one full-time registered graduate nurse; in plants employing a registered graduate nurse on a part-time basis; and in plants in which such activities were carried on solely by non-professional personnel such as practical nurses or first aid attendants. Some of the non-

professional personnel had completed Red Cross or Bureau of Mines first aid courses.

The first group of plants, those employing at least one full-time registered graduate nurse, predominated and constituted the chief group for purposes of the survey. Of the 924 plants surveyed, 868 were of this type and employed a total of 3,027 nurses. The National Survey of Registered Nurses showed that in 1941 there were some 6,000 industrial nurses in the country on both active and inactive status. Recent estimates indicate that in 1942 this number probably had increased to 9,000 or 10,000. If this figure is correct, the activities of approximately one-third of the registered industrial nurses in the country are covered by the survey.

The other two groups of plants were comparatively small. Twenty-two plants with part-time nursing service were surveyed. In 34 other plants, nursing service was rendered by practical nurses or first aid attendants.

FACTORS INFLUENCING RANGE OF DUTIES

The survey revealed that the duties of industrial nursing personnel ranged from "strictly first aid" to an all inclusive program embracing the present concept of health promotion in industry. Such activities include care and treatment of injured and ill workers, assistance with medical examinations, participation in health education programs, assistance with safety education and accident prevention, assistance with plant sanitation, participation in welfare activities, and home nursing services.

The nurse may be engaged in one or all activities pertinent to such programs. The extent to which she participates is determined not only by the attitude of the management toward health and welfare of employees, the differing occupational needs and health

requirements of workers, but also her own professional preparation, vision, and initiative.

When the type of medical service provided in the plant was considered, the analysis indicated that the responsibility delegated to the nurse was greater and her activities were more numerous in industries where the physician was on call than in those plants where the physician served part-time or full-time, particularly in the latter case. Physicians served full-time in 23 per cent of the plants surveyed, part-time in 37 per cent, and on call in 40 per cent.

When nurses' activities were correlated with plant size as determined by the number of workers, similar trends were observed but not to the same degree as in the cases of classification by type of medical organization.

Three other factors influencing the duties and responsibilities of the industrial nurse are (1) the provision for written standing orders or written procedures, (2) the type and extent of nursing supervision, and (3) the relation of the medical department to other departments in the plant organization.

WRITTEN STANDING ORDERS

It is a recognized principle that all nursing care should be given under the direction of a licensed physician. It will be noted that 77 per cent of the industrial nurses surveyed were employed in plants where the physician served part-time or on call, and hence it was necessary for the nurse to assume greater responsibilities. Suitable instructions in the form of written standing orders should be provided by the part-time or on call physician to insure satisfactory service during his absence. It is the responsibility of the nurse to secure such orders. Standing orders are a protection to the nurse, to the worker, and to the management.

Written orders outlining the procedures to be followed were provided for nurses in 42 per cent of the plants with full-time physicians, in 37 per cent of the plants having part-time physicians, and in 30 per cent of the plants where the physician is on call. Thirty-six per cent of all plants surveyed provided written standing orders for nurses.

Recognizing the serious import of these findings, the Advisory Group made the following recommendations. *Nurses working without the direction of a full-time physician should have written standing orders. Where no one physician is responsible for the plant medical service, the nurse may secure standing orders from the committee on industrial health of the county medical society.* Further, the nurse working under the direction of a full-time physician should have written procedures for her guidance. In plants where non-professional workers are employed, written standing orders and/or written procedures should be furnished for the guidance of such personnel.*

SUPERVISION

While it was not possible to determine from the data the effect nursing supervision had on the extent or character of the nurse's participation in the plant services, undoubtedly this is a contributing factor. Provision for nursing supervision was reported in 48 per cent of the 420 plants employing two or more nurses. After consideration of this factor, the Advisory Group defined supervision as follows:

Supervision is a democratic situation in which a person who has had opportunity to acquire a broad knowledge of her field and

* Suggested written standing orders have been prepared by the Council on Industrial Health of the American Medical Association and have been made available to the component societies for the use of their state and local committees. Several state divisions of industrial hygiene have prepared suggested standing orders which are available to industrial nurses.

has proved her ability offers to share her knowledge and experience with another person in such a way as to help that person to do better work more easily and with greater satisfaction.

Believing in the importance of nursing supervision for industrial nurses, the Advisory Group recommended that *where two or more nurses are employed, one nurse be designated as one of the following, depending upon the size of the nursing staff and the amount of responsibility delegated to her: director of nursing service, nursing supervisor, chief nurse, head nurse, or charge nurse. Further, when the nursing staff of the particular industry is not sufficiently large to warrant the employment of a nursing supervisor, the facilities for advisory service offered by the state department of health or the insurance company should be utilized.*

As has been previously pointed out, the character and extent of nursing participation in the industrial health program is dependent upon the nurse's professional knowledge and understanding. One of the ways in which her professional growth and development can be fostered is through membership in professional organizations. Nurses should maintain their professional affiliations and be interested in keeping up with advances in their profession. The affiliations desirable are alumnae, district and state associations and the American Nurses Association, the local industrial nurses groups and the American Association of Industrial Nurses, the state organization for public health nursing, and the National Organization for Public Health Nursing.

RELATION OF MEDICAL DEPARTMENT

The relation of the medical (including nursing) service to other departments within the plant organization has considerable influence on the development of health service. To facilitate the effective operation of the

medical department the person in charge should be able to discuss problems with top management. Management should consider its medical department as an asset rather than a luxury, or, as in some instances, a liability. It should be given the status which it merits on a par with operations. It was recommended that *the medical department, regardless of size, should be responsible to an executive of the organization.*

ACTIVITIES

The following summary is based on the analysis of the activities of 3,027 full-time registered graduate nurses employed in 868 establishments, irrespective of plant size or the prevailing type of medical organization. The recommendations concerning each activity were prepared by the Advisory Group.

Nursing care and treatment—Nursing care and treatment of occupational injuries and illnesses and emergency care of non-occupational illnesses was carried on by practically all of the nurses included in the survey. However, there were a few industrial nurses employed for mining and textile mill villages who gave no nursing care and treatment in the plant, but served the workers and their families in the latter's homes.

Hospital nursing may also be a function of the industrial nurse. Thirty-seven establishments operate their own hospitals. In all but two of these, nurses rendered nursing care to hospitalized workers and, at times, assisted in the plant dispensary.

In plants where a full-time physician is employed, the nurse's responsibility for care and treatment is limited to assisting the physician, or to the care of workers who do not need the attention of the physician. In plants employing a physician part time or on call, the nurse sees all workers who are injured

or ill and exercises judgment relative to medical treatment. She may administer the necessary care, give emergency care until the part-time physician makes his regular visit, or refer the worker immediately to a physician or to the hospital.

The importance of the nursing care and treatment phase of industrial nursing is frequently minimized by other professional groups. However, it requires professional competence, skill, and the exercise of judgment, particularly in plants where only part-time or on call medical service is provided.

Assistance with medical examinations—The second major activity of industrial nurses is assistance with medical examinations of workers. Over three-fourths, or 82 per cent, of the establishments did medical examinations of the workers either as a part of the preplacement or of the employment policy. This large proportion is accounted for by the fact that only those plants with some type of medical program were surveyed.

Practices differed as to where the medical examinations were performed. It was found that nurses assisted in 78 per cent of the 464 establishments which provided for medical examinations of workers at the plant, and in 10 per cent of the 250 plants which arranged for examinations at the physician's office, the hospital, or at some central clinic.

Although it would seem that a high percentage of the nurses assist with medical examinations, the data indicated that such assistance was frequently limited in extent. In some plants, nurses assisted with many of the following activities: taking the history, recording the findings of the physician, chaperoning female workers, testing vision and hearing acuity, measuring height and weight, taking readings of blood pressure, temperature, pulse and respiration, and taking speci-

mens for serological and other laboratory tests. In other plants nurses performed only one or two of these activities. Apparently more adequate health services in industry could be provided by further utilization of nursing skills.

The nurse's assistance during the medical examination may aid the physician to secure the worker's understanding (1) of the value and use of the medical service, and (2) of the value of the examination and the procedure to be followed. In addition, her assistance will conserve the time of the physician.

It was recommended that *nursing assistance in the medical examination, both preplacement and other types, should include the following activities: (1) Interviewing the worker previous to the examination; (2) doing routine tests and explaining their significance; (3) taking specimens for serological and other laboratory examinations and explaining their significance; (4) interpreting to the worker plant policies regarding health and welfare and his responsibility for coöperation; (5) making periodic inspections for symptoms and indications of occupational diseases; and (6) making inspections and interviewing workers in connection with return-to-work permits.*

Nurses were called upon to do the urinalysis in one-half of the 370 establishments where physical examinations which required laboratory tests were made in the plant. The examination was usually limited to testing for sugar, albumin, and specific gravity. In 9 plants nurses performed the complete function of a laboratory technician and did serological and other indicated tests.

Although a large proportion of the establishments arranged for x-rays of workers when such were indicated, the survey showed that only 170 were equipped with x-ray equipment. In almost one-half (48 per cent) of these

plants the work was done by the plant nurse.

These data show that a fairly large number of nurses were engaged in special technical services not usually included in professional nursing preparation and for which trained technicians could have been secured. It was necessary for the nurse in these cases to learn the several technics before she could successfully perform the duties involved. The volume of work required, the physician's preference, and the attitude of the management toward the employment of technicians are some of the factors which determine the nurse's participation in these activities.

Since it is frequently necessary for the industrial nurse to do laboratory work, take x-rays, give physiotherapy treatments, make electro-cardiograms and basal metabolic tests, the Advisory Group recommended that *the nurse have special training in the technics of rendering each of these services when they are required of her. However, when the volume of special technical services requires the time of one individual, a technician rather than a nurse should be employed.*

Participation in health education program—Modern concepts of industrial health have perhaps wrought more changes in the field of health education than in any other aspect of the industrial health program. The survey indicated that nurses did very little health education work. However, the incompleteness of records and reports concerning such services rendered by the nurses prevented collection of reliable data on this activity.

Informal counselling with workers during the course of treatment, the distribution of health literature, and the follow-up of remediable physical defects were some of the specific ways in which nurses were participating in health education.

Organized health education programs

were carried on in less than 20 per cent of the plants. These embrace preventive as well as promotional activities in the control of tuberculosis, syphilis, colds, and occupational diseases, and in the field of dental hygiene, mental hygiene, fatigue, and rehabilitation of the worker.

It is generally conceded that an industrial nurse has almost unlimited opportunity for health education and health supervision of industrial workers. The extent to which she takes advantage of this opportunity depends on her ability and understanding as well as on plant policies. Also in industries where a high occupational injury rate exists the volume of treatments may prevent the nurse from utilizing the opportunities for health education. Further, since the medical examination records are not available to the nurse in many plants, this obviously limits the amount and quality of health instruction she can give workers. Finally, a planned program for health education and supervision of workers comparable to the safety education and accident prevention program in force in many plants is essential if the nurse's participation is to be effective.

Conservation of the health of industrial workers in order to improve efficiency and lessen absenteeism is recognized as vital to production. Therefore, the Advisory Group recommended that *the nurse's participation in the plant health education program be extended and improved. Such a program should include definite plans for: (1) Follow-up for correction of remediable conditions; (2) supervision and rehabilitation of workers with adverse health conditions; (3) maintenance of complete records showing care given for non-occupational conditions; (4) health teaching in the training program; (5) utilization of community resources including private physicians, health and welfare agencies.*

Another health education activity is the teaching of formal classes. One hundred and ten nurses indicated that they taught regularly scheduled classes in home nursing, standard or advanced first aid. Frequently, not only workers but also their families enrolled in these classes.

Home nursing classes afford the woman worker an opportunity to improve her knowledge of general health and to gain an understanding of methods of caring for sick members of her family. First aid instruction makes the worker more safety conscious. It was recommended that *nurses in industry take the necessary steps to become authorized Red Cross Home Nursing and First Aid Instructors.*

Assistance with safety education and accident prevention—Although at times the nurse's conception of the extent of her activities in health education and promotion among workers was vague, usually little doubt existed concerning her part in the safety activities of the plant. In some cases she had complete responsibility for such activities; in other cases her duties were limited to the preparation of reports on accidents and to attendance at meetings. In 34 per cent of the 674 establishments which have organized safety committees, nurses participated as members. In fact, two of the nurses were safety committee chairmen, and 24 were secretaries. In another 5 per cent, nurses reported that, although not members, they attended meetings and often gave talks on safety education.

Nurses assisted actively in plant accident investigations in 41 per cent of the plants. They went to the scene of the accident, interviewed witnesses, and conferred with the foreman concerning recommendations for prevention of similar accidents. Fifty nurses reported voluntarily that they were responsible for the purchase, distribution, and maintenance of goggles, safety

shoes, respirators, uniforms, and similar protective equipment.

The amount and character of the nurse's assistance with the safety education and accident prevention program is due in a large measure to the fact that provision is made through plant policy for such a program and that state laws and insurance company practices require adequate and complete records of compensable occupational disabilities.

It is recognized that many of the services now being rendered by nurses are not essentially nursing. However, the contribution which industrial nurses can make to the reduction in the rate and severity of accidents should not be minimized. Therefore, the Advisory Group recommended that *the nurse should not be responsible for the planning or direction of the safety program but that she assist in the following activities: (1) Proper placement of workers according to physical and mental fitness; (2) teaching the training course; (3) safety committee work; (4) record and report keeping; (5) individual instruction of workers regarding accident prevention; (6) visual education, movies, posters, and printed material; and (7) distribution and care of protective equipment.*

Assistance with plant sanitation—In industries where sanitary engineers are employed, the responsibility of the nurse is limited to the assistance of sanitary inspections of toilet, wash, rest, and change room facilities for women workers. Nurses in 9 per cent of the establishments surveyed performed this duty. In another 23 per cent, they also assisted with inspections of ventilation, lighting, and housekeeping facilities. Nurses assumed the complete responsibility for routine plant inspections in 5 per cent of the establishments. Many nurses reported voluntarily that they were responsible for the supervision of matrons when such

were employed, and likewise for the cleaning force.

It was recommended that *the nurse show an active interest in all phases of plant environment that affect the health and morale of the worker. However, direct responsibility for the supervision of plant sanitation should be delegated to other departments whenever possible.*

Participation in welfare activities—In general, the workers avail themselves of the opportunity to discuss their financial, marital, religious, and other home troubles with the plant nurse. Many plants provide a special department to handle the worker welfare activities. In such plants the nurse refers the problems to that department for further action. Otherwise, she may assume complete responsibility for welfare activities.

In addition, nurses indicated that they were responsible for the inspections of the cafeterias in 43 plants, and gave dietary advice to cafeteria managers in 13. The nurses managed the cafeteria or lunchroom in 8 plants, including the hiring and firing of workers, planning menus, and ordering of supplies.

Welfare activities in a plant are recognized as contributing to the morale and efficiency of the worker. Therefore, it was recommended by the Advisory Group that *nurses participate in and promote welfare activities. The nurse's participation may include: (1) Development of group sick benefits, hospitalization, and life insurance plans; (2) personal counselling with workers regarding welfare problems; (3) development of recreation program; (4) coöperation with local welfare agencies; (5) planning of cafeteria, lunch rooms and canteen services.*

Home nursing service—In 21 per cent of the establishments surveyed, nurses made at least 5 home visits a month, in addition to performing their duties in the dispensary. Additional nurses

were employed for home visiting in 6 per cent of the plants. Among the reasons for making home visits are: (1) To give health supervision; (2) to determine eligibility for benefits; (3) to ascertain causes of absence; (4) to assist the worker with his social problems; and (5), less frequently, to give nursing care to the ill or injured worker. A few other establishments have arrangements with the local nursing associations or contracts with insurance companies for home visits. Three of the reasons for which visits are made to the homes of workers, namely, those to determine eligibility for benefits, to ascertain cause of absence, and to assist the worker with social problems, do not require the skills characteristic of nursing but may be essential to the service.

Home nursing care for injured and ill workers aids in the promotion of the general health, reduces absenteeism, and contributes to the morale of workers. The data indicated that this service is seldom rendered by plant nurses. However, when home visits are made by the staff of a nursing association, either through provisions of group insurance or arrangements between the plant and the association, the primary purpose for making the visit is to give nursing care.

Several factors make it more desirable for an industry to enter into a contract with a local visiting nurse association rather than to employ a nurse for home service. The travel time necessary for a nurse to make a special trip to the home of a worker who is commuting from a great distance makes the cost of such visits in time and money impracticable. In this connection the recognition on the part of industrialists of the need to avoid duplication of service—duplication of activities performed by a community agency in which they as responsible citizens of the community are interested—is of great importance. When this factor is

fully appreciated, industry will recognize the advantage of having the community nurse serve the plant for all home visiting, inasmuch as she may already be serving the family, and therefore is in a position to contribute her knowledge of family health problems to the industrial medical department.

After review of the data the Advisory Group recommended that *home nursing service be provided by the plant. The plan for visiting sick or injured workers in their homes should be developed to secure maximum benefits to the workers and to the plant. Employment of nurses for this service may be necessary where community resources are not available or cannot be coordinated with company policy.*

Records and reports—Another important function of the nurse is completing and filing records and preparing reports of first aid activities. All nurses keep records of treatments. Some are complete and others quite sketchy, depending on the requirements of the management and the nurse's own knowledge of such matters. The analysis revealed that nurses were given clerical assistance with their records and reports in 35 per cent of the establishments. Medical departments in the larger plants are usually staffed with full-time clerks and stenographers, relieving the nurse completely of this responsibility.

In 65 per cent of the establishments nurses were required to submit periodic reports on activities of the plant dispensary to the management or to the physician in charge. In 56 per cent of the plants nurses assisted with workmen's compensation reports.

Records and reports are to the industrial nurse what bookkeeping is to the accountant. They make it possible for her to prove to management the desirability of and the value derived from industrial nursing service.

It was recommended that: (1) *The medical records be kept strictly confidential except as interpretations of them are needed by management;* (2) *all medical records be kept in the medical department and available for use each time a worker presents himself for care;* (3) *when the physical examinations of workers are made outside the plant, the records or copies thereof be made available to the nurse;* (4) *clerical assistance be provided in order that the nurse's time may be conserved and records adequate.* Further, the following types of records and reports are needed: (1) *Daily record or log;* (2) *individual record including the medical examination, clinical visits, and the correction of remediable conditions;* (3) *disability absentee records;* (4) *compensation records and reports;* and (5) *monthly and annual reports to management.*

CURRENT PROBLEMS OF INDUSTRIAL NURSING

One of the objectives which the committee hoped to achieve through the survey was some insight into current problems of industrial nursing. However, when the original plans for the survey were made, the committee did not anticipate the war and the accompanying demands for nursing service which we are witnessing today.

The extent to which nursing services in industry have expanded is revealed strikingly by the survey. Of the 2,450 full-time registered nurses for which data were available, 40 per cent began their employment in 1942. Between January, 1940, and December, 1942, more than two-thirds, or 70 per cent, of the nurses began their employment. Thirty per cent were on their present jobs prior to 1940.

Thirteen per cent of the 850 plants for which data were available established nursing services for the first time in 1942. Thirty per cent of the serv-

ices were established during the last three years. It is interesting to note that only 7 per cent of the remaining plants established nursing services prior to 1915.

As a result of the unprecedented demand for graduate registered nurses in industry, numerous questions have arisen: What professional channels, if any, are utilized in the selection of these nurses? What qualifications are required? On what basis is salary determined? Are they employed to render services essential to the maintenance of the industrial health program? Is the nurse's time conserved wherever possible? What is the desirable number of nurses per unit of employees? Could a part-time nursing service meet the needs of the plant?

SOURCE OF SUPPLY

In the past many employers have not been aware of the professional channels through which nurses might be secured for positions in industry. Various sources have been used with the result that frequently the selection of the nurse has been made without giving proper consideration to duties and responsibilities of the position.

The Advisory Group recommended that *nurses for industry be obtained through professional nursing channels such as: (1) registries approved by local or state nurses' associations; (2) Nurse Placement Service* ; (3) schools of nursing and universities offering courses in industrial hygiene; (4) insurance companies; and (5) divisions of industrial hygiene in state departments of health.* It was further recommended that *the local industrial nurses group act in an advisory capacity to the above organizations in regard to the needs of industry and nurses who are available.*

QUALIFICATIONS

In order to assist management and others interested in the employment of industrial nurses, desirable qualifications were enumerated by the Advisory Group as follows:

A. Personal

1. An interest in, and an ability to work effectively with, all types of people
2. Good physical health
3. Emotional stability
4. Initiative and good judgment
5. Resourcefulness
6. Ability to organize, especially where nursing supervision is not provided
7. Ability to appreciate the importance of one worker's health to the efficient operation of the industry as a whole

B. Academic

1. High school graduation
2. Advanced education on a college level—desirable
3. Ability to type for the purpose of record keeping—desirable

C. Professional

1. Graduation from an accredited school of nursing connected with a hospital which had a daily average of 100 patients or affiliations with other schools of nursing which provide a broad clinical experience in medical, surgical, obstetrical and pediatric nursing
2. Registration in the state of employment in accordance with the Nurse Practice Act
3. Postgraduate study in industrial nursing with public health aspects—desirable

D. Experience

Experience in hospital emergency room, out-patient surgical department, industrial clinic, and public health nursing—desirable.

It was recommended that *industrial nursing organizations make an effort to encourage the employment of nurses who have had the industrial nursing preparation which is available at the present time.*

SALARY

It seems logical to expect that the basis for salary (or compensation) should be the same as that for supervisors of departments, according to the

* S South Michigan Avenue, Chicago, Ill.

responsibilities involved and the qualifications and experience which are required. The Advisory Group recommended that *a job analysis be made to depict the responsibilities involved in the particular position and that the salary be commensurate with these responsibilities.*

ESSENTIAL SERVICES IN INDUSTRY

The National Nursing Council for War Service recommends¹ that industrial nurses who are not essential for maintaining minimum health services should serve with the armed forces.

It is considered that the industrial nurses who are essential for maintaining minimum health services are:

1. The nurses who have established health programs in essential industries
2. The nurses who are holding administrative or supervisory positions in the medical departments of essential industries
3. The nurses who have special skills or preparation essential to the maintenance of medical departments

In accordance with this policy the Advisory Group recommended that *staff nurses who are eligible for military service and who may be replaced by nurses not eligible for such duty should be encouraged to enroll for service with the armed forces and should be granted military leave.*

NON-PROFESSIONAL CLINIC ASSISTANTS

In keeping with the national effort to conserve nurse-power during the war emergency, it was recommended that *non-professional clinic assistants be employed in so far as possible, and that the following duties be assigned to them: (1) Securing of specimens and care of specimen bottles; (2) filling of hot water bottles and ice bags; (3) bed making; (4) sterilization of instruments and supplies; (5) assistance with*

dressings; (6) making surgical supplies; (7) care of change rooms, rest rooms, and toilets; (8) training of matrons. It was further recommended that *there be written instructions governing the activities of the non-professional clinic assistants and that such assistants be supervised by the nurse.*

DUTIES OUTSIDE THE MEDICAL DEPARTMENT

The analysis revealed that the activities of nurses are not necessarily confined to the medical department. They range from selling telephone slugs and defense bonds to delivering babies. Nurses act as receptionists, relieve in the canteen or at the switchboard. They attend funerals and weddings, and write letters of congratulations and condolences. Nurses in 91 plants reported that they assist with the clerical and secretarial work in other departments of the plant, figure out wage rates and make out and distribute pay checks. In 30 plants they engage actively in personnel work, hire and fire employees, and keep worker employment records. In 25 plants nurses fingerprint and photograph employees and give identification badges.

In many instances when a nursing service is being initiated by industry the nurse combines with her nursing functions various duties unrelated to health services. Since it has been demonstrated that a plant employing as few as 100 workers can profitably employ a nurse full time, it was recommended that *the nurse's activities be limited to those of the medical department.*

NUMBER OF NURSES PER UNIT OF EMPLOYEES

The number of nurses employed should depend on the type of industry and the number of workers. For the maintenance of complete health service

¹ *Priorities for Nurses.* National Nursing Council for War Service, 1790 Broadway, New York, N. Y.

in an industry it was recommended that *there be 1 nurse for up to 300 employees, 2 or more nurses for up to 600 employees, and 3 or more nurses up to 1,000 employees, 1 nurse for each additional 1,000 employees up to 5,000, and 1 nurse per each additional 2,000 employees. Additional nurses may be required because of hazards present in a particular plant and to supply service for second and third shifts.* This number will be reduced in inverse ratio to the number of technical and non-professional workers employed in the medical department. Smaller industries (those employing less than 500 workers) which do not have serious occupational hazards may find part-time nursing services adequate.

PART-TIME NURSING SERVICES FOR SMALL INDUSTRIES

Comparatively few employers have felt that full-time nursing service for less than 500 employees is a sound investment. It is being realized to an increasing extent that the number of employees cannot be used as a criterion of the need for an industrial health program. Rather the hazards associated with the working environment and the health problems of the employees are the deciding factors. Effective part-time nursing services have been developed in some cities to meet the needs of the smaller industries through utilization of community nursing agencies or through several plants sharing the services of one nurse. Frequently such part-time service has demonstrated the extent of service needed. In some instances the part-time service has consequently developed into a full-time service, and in other instances the part-time service has been adequate to meet the needs of the plant.

It was recommended that *the use of part-time nursing service should be extended, particularly in plants employing less than 100 workers.* It was further

recommended that *local industrial nursing organizations coöperate with the state industrial hygiene divisions in giving guidance to individuals or agencies which may be utilized in providing such services.*

SUMMARY

The above report of the nation-wide survey conducted by the Committee to Study the Duties of Nurses in Industry serves as an initial attempt to define industrial nursing. Data concerning the nursing service were obtained from 924 industrial establishments employing approximately 2,500,000 workers and located in 36 states and the District of Columbia.

Of the 924 plants, 868, or 95 per cent, employed one or more full-time graduate registered nurses. A total of 3,027 nurses, or about one-third of the registered industrial nurses in the country, were at work in these establishments. Twenty-two of the remaining plants employed nurses part time, and 34 utilized only practical nurses or first aid attendants.

Duties of the full-time nurses were classified into eight general groups: (1) Nursing care and treatment of occupational injuries and illnesses and emergency care of non-occupational illnesses; (2) assistance with medical examination of workers; (3) participation in the health education program; (4) assistance with safety education and accident prevention; (5) assistance with plant sanitation; (6) participation in plant welfare programs; (7) home nursing service; and (8) records and reports. While these classifications serve in a general manner to delineate industrial nursing, a true definition of the profession will not be possible until further standardization of duties is achieved.

Recommendations of acceptable practices in industrial nursing have been made by the Advisory Group of indus-

trial nurses appointed to consider the reported data in light of their own knowledge and experience in this special field. Briefly, the major recommendations are as follows:

1. A nurse working under the direction of a full-time physician should have written procedures for her guidance. All other nurses should have written standing orders.
2. Where two or more nurses are employed, one nurse should be designated as in charge.
3. The medical department, regardless of size, should be responsible to an executive of the industrial establishment.
4. Nursing assistance in the medical examination, both preplacement and other types, should include six specific activities. (See page 870.)
5. When the volume of special technical services requires the time of one individual, a technician rather than a nurse should be employed.
6. The nurse's participation in the plant health education program should be extended and improved. (See page 871.)
7. Nurses should take steps to become authorized Red Cross Home Nursing and First Aid instructors.
8. The nurse should not be responsible for the planning or direction of the safety program but should assist in seven specific activities. (See page 872.)
9. The nurse should show an active interest in all phases of plant environment that affect the health and morale of the worker, but direct responsibility for the supervision of plant sanitation should be delegated to other departments whenever possible.
10. Nurses should participate in and promote worker welfare activities, especially in relation to five particular services. (See page 873.)
11. Home nursing service for workers should be provided by the plant.
12. Records and reports are to the industrial nurse what bookkeeping is to the accountant, and an efficient system should be maintained. (See page 874.)

The chief problems in the field of industrial nursing today have been brought about by the very rapid expansion of this service and the marked increase in the number of nurses employed in various war industries. Of the 2,450 full-time registered nurses who

supplied the information, more than two-thirds, or 70 per cent, began their employment between January, 1940, and December, 1942. The lack of standardization already existing in this branch of the nursing profession, coupled with this increase in the number of nurses employed without previous experience or preparation, places a heavy responsibility on the comparatively small number of nurses practising in industry.

The Advisory Group, recognizing the serious import of these problems, has made recommendations which it is believed will promote the best interests of industrial nursing. The major recommendations may be briefly stated as follows:

1. Nurses for industry should be obtained through professional nursing channels only. (See page 875.)
2. A job analysis should be made to depict the responsibilities involved in a particular industrial nursing position, and a salary should be set for the position commensurate with these responsibilities.
3. Staff nurses who are eligible for military service and who may be replaced by nurses not eligible for such duty should be encouraged to enroll for service with the armed forces and should be granted military leave.
4. Non-professional clinic assistants should be employed, in so far as possible, to conserve nurse-power in performing eight specific duties. (See page 876.)
5. One nurse should be employed for up to 300 workers; 2 or more nurses for up to 600 employees; 3 or more for up to 1,000 employees; 1 nurse for each additional 1,000 employees up to 5,000, and 1 nurse for each additional 2,000. Other nurses may be required because of hazards present in a particular plant and to supply service for second and third shifts.
6. The use of part-time nursing service should be extended, particularly in plants employing less than 100 workers.
7. The local industrial nurses' organization should act in an advisory capacity to other professional groups and to state industrial hygiene divisions in regard to the needs in a local industry and the services of the nurses employed therein.

Incidental to the collection of the survey data, certain benefits accrued to the participating groups. The Working Group responsible for gathering the data acquired more knowledge of and interest in this field. Industrial nursing organization was furthered. Also, the nurses most vitally concerned with

the development of industrial nursing were afforded an opportunity to plan for and promote their specialty through serving on the Advisory Group.

NOTE: The committee acknowledges with appreciation the work of Victoria Trasko, Assistant Statistician, National Institute of Health, U. S. Public Health Service, in doing the statistical analyses.

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Proposed Report on the Educational and Experience Qualifications of Laboratory Workers*

I. THE GENERAL SCOPE OF PUBLIC HEALTH LABORATORY WORK

Historically the public health laboratory has been basic to environmental sanitation and to epidemiology, and it continues to be a most important fact-finding center of the health department. Because of the long-standing recognition of these functions, the public health laboratory may be regarded as among the most completely stabilized activities of health departments. Nevertheless, both the amount and the kinds of service expected of the laboratory have recently been expanded. Advancing medical discoveries are likely still further to enlarge the volume and the content of the program. It will be conceded that in almost every area of North America more laboratory service could be used with benefit to the public health program.

Extent and Coverage of Laboratory Personnel

The field of public health laboratory service now includes at least 1,300 workers in professional grades, according to a recent review of official agencies only. No satisfactory estimate is available of the number of professional persons engaged in private laboratories. The

present membership of the Laboratory Section of the American Public Health Association is made up of somewhat over 1,000 members and Fellows. The proportion of these in various types of work was recently as follows:

| | <i>Per cent</i> |
|---|-----------------|
| Public health laboratory work..... | 37 |
| Clinical and hospital laboratory work.. | 19 |
| Academic work | 22 |
| Industrial laboratory work..... | 13 |
| Other types of service..... | 9 |

As to duties performed by public health laboratory workers, there are listed herewith the functions of a public health laboratory and the duties of the workers are readily inferred.

II. THE FUNCTIONS OF A PUBLIC HEALTH LABORATORY INCLUDE:

1. Bacteriologic, serologic, pathologic, chemical, and other examinations to aid in the diagnosis, control, and treatment of communicable and certain non-communicable diseases

2. Bacteriologic, serologic, pathologic, chemical, and other examinations associated with the diagnosis and control of diseases occurring among domestic and wild animals, and transmitted to man

3. Bacteriologic, chemical, microscopic, and other examinations of water, sewage, industrial wastes, shellfish

4. Examination of milk, frozen desserts, and other foods, drugs, liquors, narcotics, etc.

5. Production or provision of diagnostic, prophylactic, and therapeutic preparations, such as sera, antitoxins, toxins, vaccines, etc.

6. Research. Research is an important function of every public health laboratory. It is essential to the development of new and better methods for the control and prevention of disease, and promotes in the staff that critical attitude toward methods and results without which an acceptable standard of work cannot be maintained.

* The Committee on Professional Education of the A.P.H.A. publishes this report before transmittal to the Governing Council in order to permit the members and Fellows of the Association to review it and to offer criticisms and suggestions in the further consideration of the report.

This report, like all other statements of the committee on professional and technical qualifications in public health, is subject to periodic revision in order that it may be kept abreast of the best thought.

III. THE EDUCATIONAL BACKGROUND

The basic preparation for public health laboratory work should essentially be professional preparation in bacteriology, chemistry, serology and/or parasitology, and in all cases the minimum training should be a college degree, with emphasis on at least chemistry, physics, and biology.

Promotion in responsibility should be based not only on experience but on the expectation that additional academic training will be secured. The ultimate balance between formal training and practical experience will have to be adjusted within each state or provincial system. In general, it is to be expected that an individual will make promotional progress through the classifications given below.

Outline of Training and Experience

In view of the diverse functions of a public health laboratory, the system should be so devised that an individual as he makes promotional progress toward the grade of Director should have:

1. Training in general biology
2. Advanced special training in one or more of the biological sciences, together with the training and the personal qualifications necessary for conducting research in one or more of them
3. Acquaintance with the biology of disease
4. Experience in a public health laboratory such as that described in this report
5. Administrative experience in the various divisions of the laboratory
6. Competence to interpret the place of the laboratory in the whole health program

Personnel Policies Encouraging Career Service in Public Health Laboratory Work

Regarding the titles of positions, it makes little difference what nomenclature is used in a particular laboratory system so long as training to the level of at least the baccalaureate degree is considered a minimum requirement.

However, the term "technician" in related fields has so commonly been applied to persons who do not hold college degrees that it is desirable that the term be avoided in connection with the professional staff of public health laboratories.

Four levels have been provided in the classification of grades used in this report. Local conditions, however, may make it wise to provide a different number of grades. The exact number is immaterial so long as reasonable promotional opportunities are provided.

The unification within one system of all laboratory services relating to the protection of the public health is desirable, but at present only federal, state, and large municipal laboratories approach organization of this character. This report deals primarily with the larger laboratory systems. It is recognized, however, that most systems of laboratory service will contain smaller laboratory units with a staff of but one or two persons in whom must be combined several of the skills herein described. It is essential to have such smaller units incorporated into larger systems, such as that for a state, which will provide uniformity of standards and suitable promotional opportunities.

It is recognized that no single pattern can apply throughout North America, and it is well known that several states or provinces have well matured systems based on quite different patterns. It is not intended that these systems should be disturbed so long as they accomplish the purposes of high professional achievement. Rather it is desired to provide a broad framework for the guidance of interested persons in situations not enjoying the benefits of such established patterns.

This report should be thought of as a yardstick for a state, provincial, or territorial system of laboratory service, rather than as a pattern for an individual laboratory. It assumes that the

laboratory is a part of a well organized health department, operating under a modern merit system, and that the laboratory, together with all other divisions, is responsible for a well integrated service, both within the department and within the community.

IV. QUALIFICATIONS FOR VARIOUS GRADES OF LABORATORY WORKERS

The specific training and experience described below are regarded as the minimum qualifications for adequate laboratory service. These qualifications are not intended to be retroactive, but to apply to the selection of new personnel as positions become available.

A. Director

The director of a public health laboratory as defined in this report should possess those qualities of personality and character necessary to insure the honest and successful prosecution of scientific work. He should have an educational background in the biologic sciences at least equivalent* to the requirements for a doctorate in biological science, public health, or medicine as prescribed by a university belonging to the Association of American Universities or a medical school approved by the American Medical Association.

In addition he should have:

- a. Five years' postgraduate practical experience and training in a laboratory of such size that experience may be obtained in the various biological sciences applicable to health and sanitary problems. Not less than two of the five years of postgraduate training and practical experience should have been devoted to training

in general and special laboratory technics applicable to the recognition of disease in the human family and disease in animals transmissible to man, and in health and sanitary problems.

- b. At least two years' administrative experience in a properly directed public health laboratory of such size that experience in the coördination of various laboratory functions may be obtained.

B. Assistant Director

He should have the formal educational qualifications outlined above for the Director. In addition he should have at least three years of practical experience and training in general and special laboratory technics as provided for the Director.

C. Pathologist

a. Principal Pathologist

He should have graduated from a medical school approved by the American Medical Association, and should have postgraduate training and experience equivalent to that prescribed for certification by the American Board of Pathology. Essentially this requirement is for five years of special training and experience after graduation from medical school, made up of an internship in an approved hospital, study of pathology for not less than three years in a recognized institution, and at least one year of further training or practice in pathology.

b. Associate Pathologist

He should have graduated from a medical school approved by the American Medical Association, and should have had not less than one year devoted to practical experience in the study of general and special human pathology and related medical subjects.

* The word "equivalent" as used in this report is for the purpose of assuring that, under special conditions, certain of the requirements relating to formal education may be waived, provided however that the qualifications of the applicant equal or exceed those specified.

D. Bacteriologist**a. Principal Bacteriologist (or Serologist)**

He should have an educational background in biological sciences equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology, and at least two years' practical experience in a public health laboratory.

b. Associate Bacteriologist (or Serologist)

He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology, and at least one year of practical laboratory experience.

c. Senior Assistant Bacteriologist (or Serologist)

He should have an educational background equivalent to a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or immunology.

d. Junior Assistant Bacteriologist (or Serologist)

He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in bacteriology or related sciences.

E. Chemist**a. Principal Chemist**

He should have an educational background in biological sciences equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in chemistry and at least two years'

practical experience in a public health laboratory.

b. Associate Chemist

He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry and at least one year of practical laboratory experience.

c. Senior Assistant Chemist

He should have an educational background equivalent to the requirements for a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry.

d. Junior Assistant Chemist

He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in chemistry.

F. Parasitologist**a. Principal Parasitologist**

He should have an educational background in the biological sciences equivalent to the requirements for a doctorate prescribed by a university belonging to the Association of American Universities, with a major in parasitology and at least two years' practical experience in a public health laboratory.

b. Associate Parasitologist

He should have an educational background equivalent to a Master of Science degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology and at least one year of practical laboratory experience.

c. Senior Assistant Parasitologist

He should have an educational background equivalent to the requirements for a Master's degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology.

d. Junior Assistant Parasitologist

He should have an educational background equivalent to a Bachelor's degree prescribed by a university belonging to the Association of American Universities, with a major in parasitology.

TABULAR RESUMÉ OF TRAINING AND EXPERIENCE SUGGESTED FOR VARIOUS GRADES IN THIS REPORT

| <i>Position</i> | <i>Essential Degrees</i> | <i>Major Academic Emphasis</i> | <i>Years of Prior Experience Essential</i> |
|-----------------------------|---|---------------------------------|--|
| Director | Doctorate in science, public health or medicine | Medical and biological sciences | 5, with minimum of 2 years in a public health laboratory |
| Assistant Director | Doctorate in science, public health or medicine | Medical and biological sciences | 3 |
| Principal Pathologist | M.D. | Medicine and pathology | 5 |
| Associate Pathologist | M.D. | Medicine and pathology | 1 |
| Principal Bacteriologist | } Doctorate in science, public health or medicine | Bacteriology | 2 |
| Principal Serologist | | Serology | 2 |
| Principal Chemist | | Chemistry | 2 |
| Principal Parasitologist | | Parasitology | 2 |
| Associate Bacteriologist | } Master's degree | Bacteriology | 1 |
| Associate Serologist | | Serology | 1 |
| Associate Chemist | | Chemistry | 1 |
| Associate Parasitologist | | Parasitology | 1 |
| Senior Asst. Bacteriologist | } Master's degree | Bacteriology | .. |
| Senior Asst. Serologist | | Serology | .. |
| Senior Asst. Chemist | | Chemistry | .. |
| Senior Asst. Parasitologist | | Parasitology | .. |
| Junior Asst. Bacteriologist | } Bachelor's degree | Bacteriology | .. |
| Junior Asst. Serologist | | Serology | .. |
| Junior Asst. Chemist | | Chemistry | .. |
| Junior Asst. Parasitologist | | Parasitology | .. |

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* Not voting to approve. See next page.

EXPLANATION OF NEGATIVE VOTE ON PROPOSED REPORT ON THE EDUCATIONAL
AND EXPERIENCE QUALIFICATIONS OF LABORATORY WORKERS

The Proposed Report has my approval, except for the failure to include in the qualifications for a director the degree of Doctor of Medicine. It is my opinion that public health laboratories will continue to have increasing obligations in connection with clinical medicine; that a medical degree is essential background for a director in order that a public health laboratory may function adequately.

The question of requiring graduation in medicine as a qualification for laboratory directors in New York State was carefully considered several years ago

by the Public Health Council of New York State, and in 1937 this requirement was enacted into a regulation. As a member of the Council I voted for this provision and as Commissioner approved the Council's action.

I have found no reason for changing my opinion since that time, and feel that it would be inconsistent for me to subscribe for any lower qualifications in a report to the Association.

Otherwise, the Report has my approval.

EDWARD S. GODFREY, JR., M.D.

Erstwhile Credit Lines

THE WESTERN BRANCH MEETING—1943 STYLE

Readers of the *Journal* will recall that the usual meeting of the Western Branch which was scheduled for May, 1943, was cancelled because of the lack of a suitable place and lack of man power sufficient to operate such a gathering of 800-900 persons at one time. Nevertheless there was a realization on the part of the officers of the Western Branch that there were more compelling reasons this year for an annual meeting than ever in order that the public health professions may continue to be informed about and integrated with the movement in this critical year. It was on this account that the American Public Health Association has satisfaction in having been able to organize substitute meetings to replace the Branch meeting, and by this means to reach many more of the workers themselves than would have been possible had the annual meeting been held in San Francisco as planned. The total attendance exceeded 2,850, mostly professional workers.

An invitation had been extended some months previously to Dr. Robert Hughes Parry, Medical Officer of Health of the City of Bristol, England, and Professor of Public Health at the University of Bristol, to be in the United States during the late spring, and it was possible to organize a series of meetings around this visit of Dr. Parry and the natural interest of all health workers in the experiences of those who have been through a severe blitz. Fortunately, Dr. Parry proved to be an ideal person for this interpretation to Americans and Canadians, and he was a delightful travelling companion for the team members who found it possible to attend some or all

of the state and regional meetings which resulted.

With Dr. Parry was Dr. John L. Rice, immediate past-President of the A.P.H.A. and Commissioner of Health in New York City, 1934-1942; Dr. Erval R. Coffey, Assistant Surgeon General, U. S. Public Health Service, Washington, D. C., and formerly State Health Officer of Washington State; Dr. Don W. Gudakunst, Medical Director of the National Foundation for Infantile Paralysis, New York, N. Y., and formerly State Commissioner of Health in Michigan. Also Dr. Albert McCown, Medical Director of the American Red Cross, Washington, D. C., and formerly of the staff of the U. S. Children's Bureau; Dr. Nathan Sinai, Professor of Public Health of the University of Michigan; Dorothy Deming of the Merit System Unit, A.P.H.A., formerly General Director of the N.O.P.H.N.; and Dr. Edith Sappington of San Francisco, representing the U. S. Children's Bureau. For part of the meetings it was possible for Dr. Karl F. Meyer, Director of the George Williams Hooper Foundation, University of California, to be present. Dr. Meyer is President-elect of the Western Branch. Dr. Carl E. Buck, Field Director of the A.P.H.A. Committee on Administrative Practice, joined the team in California. Raymond Greenman, Field Representative, American Social Hygiene Association, for the Ninth Service Command, joined the group in New Mexico. Dr. Reginald M. Atwater, Executive Secretary of the A.P.H.A., directed the team. The programs were locally planned and carried out.

Dr. Parry had been in attendance at

public health meetings in Connecticut, Iowa, Kansas, Missouri, Indiana, Wisconsin, and New York prior to May 13 when the team left the East. The first meeting on the circuit was in Chicago, where the Illinois Public Health Association held an annual meeting. The arrival of the team was perfectly timed with the advancement of a new permissive health unit bill before the Legislature which is reported to have passed the Senate unanimously and, at this writing, is waiting for action by the House. This bill, sponsored by the State Health Department, will give Illinois legal opportunity for the first time to set up county units. A similar fortunate circumstance at Lincoln, Neb., made the visit of the team significant because a bill before the unicameral legislature was ready for a vote, and favorable action later followed.

Entering the territory of the Western Branch at Denver, the team enjoyed a stop of one day with public health workers of Colorado, where critical problems were brought out for consideration in a problem-solving panel in which the experience of the entire team could be mobilized. The attendance was at least as large as the usual meetings of the Colorado Public Health Association.

The next stop was at Albuquerque, where the New Mexico Public Health Association had a two day meeting, also well attended and generally agreed to have been unusually fruitful. A considerable number of the local staff had never had the opportunity to attend a Branch meeting or other larger gatherings of professional workers in public health, and the members of the team were left in no doubt as to the appreciation felt by the staffs in New Mexico.

The Arizona Public Health Association held a regular meeting of two days in Phoenix and it was said to have been the best attended of any meetings ever

held by the state group. In these states it seems to have been true that at least ten times as many persons were able to attend as would have been able to get to San Francisco for the Branch meeting, even in a normal year.

The meeting of the Southern California Public Health Association was held in Pasadena under the Presidency of Charles Arthur, Health Officer of Pasadena, and was reminiscent to many of the annual meeting of the A.P.H.A. held in the same place in 1934. More than 500 were in attendance and the problem-solving panel in Pasadena boasted 12 participants, including Dr. W. L. Halverson, the new State Health Officer. There was no doubt of the success of the meeting, which in itself was larger than some recent meetings of the Branch in normal years.

Berkeley was chosen as the place for the meeting of the Northern California group, and nearly 500 registered during the two days of meetings, when local talent was used with the national leaders to cover a very dynamic field of interest in this most dynamic state. Here as in Albuquerque, Phoenix, Pasadena, and Seattle, the contributions made by Dr. Meyer and his consultants in medical research were particularly appreciated. A panel on medical care was an outstanding feature in Berkeley.

Subsequently meetings were held in Portland, Ore., in Seattle, Wash., and in Boise, Ida., for most of the team members. A later meeting of the Montana group in Bozeman was planned and some of the team were scheduled to attend meetings near the Mexican border in Juarez and El Paso during June.

Dr. Meyer, President-elect of the Western Branch, has suggested to some of the state meetings that this pattern of a travelling team may be useful for the future as an alternate for Western Branch meetings, which at best are a considerable distance from some parts

of the Branch territory. In a year like 1943 it was generally agreed that the team idea brought leaders in touch with local problems and gave local workers some inspiration more successfully than would have been possible with one meeting of the Branch in any available city.

An account of the blitz in Bristol as presented by Dr. Parry will become available shortly through the columns of the *American Journal of Public Health*, together with selected articles growing out of these regional meetings and bearing especially on the current problems of the professional worker.

The attention of A.P.H.A. members in the western states has been called to the circumstances under which the 72nd Annual Meeting of the A.P.H.A. and the War Conference will be held in New York City, October 12-14. The Executive Board has directed that there shall be no encouragement of travel for those at a distance greater than an overnight trip from New York, excepting for selected delegates who can systematically report on the War Conference to their colleagues. These state meetings have given an opportunity for the selection of these delegates and for early planning to avoid the difficulties of travel as they now exist.

Readers of Credit Lines will be interested in the impressions of the 1943 pattern of program and meeting as expressed by various members of the team:

Dr. Parry's Impressions

After two months spent in almost continuous travel and visiting among health workers in the United States, Dr. Parry was asked to summarize his impressions about his visit and about the health activities which he had seen. He said: "It makes an enormous difference to be a member of a party on such a tour as that which I have just

taken across the States and back. This method puts one completely at home as he travels. I know that there are some thrills in travelling alone, but one can have one's fill of that. I prefer the pleasure of association with those of similar minds.

"You Americans make it easy for a stranger to make himself at home, even where there may be marked differences of opinion. It is the same knack of a lawyer who makes one confess beyond his intent. It reminds me of the lawyer who asked the man seeking damages for injury to his arm how high he could raise his injured arm and then to show the jury how high he could lift it before it was injured.

"I am impressed by the fact that you in America have accumulated all workers into an inclusive organization, the American Public Health Association. This is a unique Americanism. Neither the Royal Sanitary Institute nor the Society of Medical Officers of Health attracts the subordinate workers as you do here. The opportunity of meeting on a common ground and with those of comparable status seems to me very interesting and fruitful.

"You have here a striking enthusiasm for travelling long distances in order to attend meetings. Your concept of distance is different from ours. Travel of 100 miles seems to us enormous, while you think nothing of 2,000 or even 4,000 miles. I am a believer in the American attitude toward conferences.

"There is a vast difference between American administrative procedure and ours in England. Your executive officer seems to be so independent once he has the authority, whereas with us the executive acts as the agent or the servant of the committee. There are, of course, advantages as well as disadvantages in both methods. The authority of the public health officer here is much greater, but his individual re-

sponsibility is also greater and consequently there is a greater strain on your health officers.

"Security of tenure has different effects on different types of people. Security of tenure in office is not necessarily a good thing. In fact, nothing ever does take the place of selecting the right person for the job, either in your country or in ours. The wrong person with security of tenure is a greater menace to the service than he would have been without security, but the right man in the right post can do his work with a better heart and greater energy when he has security.

"However, the similarities between your health service and ours are equally striking. Your general attitude toward social welfare, the stress you lay upon the home, on environmental hygiene and on health education are all similar to our approach. But the way you serve your food and the natural advantages that you have for variety of food result in a more varied and satisfactory diet than ours in Britain."

Dr. Karl Meyer's Impressions

It will be no surprise to those who know Dr. Karl F. Meyer of San Francisco that his presence with the team in Albuquerque, Phoenix, Pasadena, Berkeley, and Seattle added much to the interest and value of the programs. His first hand familiarity with the medical problems of the West and his experimental approach to a great variety of conditions involving animals as well as man made it possible for him to throw valuable light on many of the questions asked of the panel. At least the other members of the team gained immeasurably from his contributions, and in this we think we were no different from the rest who attended.

Dr. Meyer was encouraged to set down some observations on the plan of using this team of travelling speakers instead of the conventional type of

meeting. He said: "The very large attendance has made it possible to bring the message to many people and as a device this method compares favorably with the usual type of meetings. The programs this year had the character of postgraduate instruction of the refresher course type. Several persons told me that they found themselves definitely motivated by this program which used panel discussions prominently instead of the usual read manuscripts.

"The comradeship which was developed among the members of the team is one of the most treasured possessions to remember. I have never seen so diversified a group live so fruitfully with each other in spite of the confined space incident to travel this year and the other travel difficulties."

Dr. John Rice's Impressions

"There were four things that impressed me on the A.P.H.A. group western trip. First the eagerness and enthusiasm of the health workers in the various states — eagerness to keep abreast of public health in wartime and enthusiasm over the importance and value of the work they are undertaking. Second, the need for more money and more man power to make possible the wider application of our public health knowledge. Third, the need for strong leadership by the official state and local health agency. Fourth, the importance of the utilization of all available health forces in a united program. Such a program may well include federal assistance, that of the nonofficial agency as well as volunteer help.

"The experience of this trip raises the question in my mind as to whether or not this undertaking attempted as a war emergency procedure may not contain within it a technic of value for normal times for the promotion of public health and in holding closer together the component parts of the A.P.H.A.

"An extra premium resulting from this trip was the extension of the feeling of confidence and understanding between the various agencies through their representatives on the tour. Besides this, public health in England and the United States moved closer together through Dr. Parry, the representative from Bristol, England."

Dr. McCown's Impressions

"My overall feeling at the end of this trip is one of gratification and satisfaction that the American Red Cross was invited to participate with this group of outstanding public health leaders in their visit to meetings of public health associations in ten states. It gave the Medical Director of the American Red Cross an opportunity to meet health officials in several states and to discuss with them the channels of better integration of the health activities of local chapters of the American Red Cross with the local health departments.

"Everywhere I sensed a realization that in these emergency times there should be close coöperation. In their health activities the Red Cross Chapters need sound medical advice, and in community activities the well organized local health department should be equipped to render such advice. Through their various training programs the local chapters of the Red Cross have trained large numbers of volunteers in first aid, nurses' aids, home nursing, and nutrition. This group constitutes a tremendous backlog of individuals who have shown their awareness of health needs and, through participation in training courses, their desire to be of service. It would seem desirable therefore that through local consultation and agreement between the health agency and the local chapter of the American Red Cross, these volunteers, having been trained, may be given an opportunity to serve.

"A feature of special interest was the round table conducted at the meeting of the Northern California Public Health Association in Berkeley on medical care, which was organized by Milton Rose, M.D., Medical Director for the Pacific Area of the American Red Cross, who acted as chairman.

"On the personal side, the Director found a spirit of genuine coöperation and friendliness and had an opportunity to make lasting new friendships and to cement old ones. It was a privilege to come to know, in the intimate contact of a three weeks' tour, the distinguished but modest and lovable visitor from Bristol, Dr. Robert Hughes Parry.

"It was specially appropriate that the agency which arranged this series of meetings was the professional society of public health workers, and the representative of the American Red Cross wishes to express his appreciation of the splendid way in which the trip was organized and managed."

Miss Deming's Impressions

"To me the most outstanding feature of these state-level national meetings was the presence of local lay people. Non-professional leaders in community life who would never travel to a national convention or even to a Western Branch meeting, heard their own home problems discussed by representatives from the federal government, the American National Red Cross, and five voluntary national health agencies. It was a chance to take their questions 'right to the top' without spending even postage putting themselves on record. The informality and good natured interchange among the experts in all the discussions made for friendly feeling and promoted the impression that the nationals were after all 'just folks,' trying to pull together for the good of all, especially for the people in the state in which they were meeting. Citizens learned quite a lot about how

their way of doing things stacked up against the best standards, and more than one person in the audience heard something entirely new about his local health department for which he was paying taxes.

"As a membership promotional device I cannot think of a better! One elderly nurse said to me, 'I've been a member of the A.P.H.A. for ten years, but this is the first time I've ever been able to get to one of your meetings. I live three hundred miles away. I'll always remember this meeting—(she referred to a particularly lively round-table discussion)—I got my question answered!'

"I think it should also be said that the ten or more staff representatives of the national agencies travelling together did quite a little housecleaning! Questions as to certain national policies of each agency—long misunderstood or misinterpreted, got cleared up, and once in a while one would hear an exclamation, 'That's a good idea! We ought to do that,'—or, generously, 'You're absolutely right. We don't go about that in a constructive way.'

"Many people spoke of the practicality of this plan of meeting, pointing out the saving of expense in combined staff travel (taxi service for example), the conveniences to the local hosts in entertaining a group instead of successive national visitors, and the chance for small conferences with several national representatives at once.

"All agreed that the down-to-the-bedrock level of the discussions of local questions, as compared to the over-all generalizations necessary in regional or national meetings, was a joyful relief. It should also be said that frequently the question as to a specific, factual situation existing four blocks away was harder for the visiting team to answer than the glib quoting of an accepted policy applicable anywhere in the United States.

"Finally, I am sure the impression left on the local groups is invaluable as an asset of good will—that the A.P.H.A. is ready to come to them when they cannot come to New York, that it has had the courage to experiment with a new 'way of life' in annual meetings and that it is able to bring together a group of health workers worth listening to, helpful—and in the case of Dr. Parry, our drawing card—inspiring."

Bristol's Method of Treating Verminous Heads

Considerable interest was expressed at the meetings addressed by Dr. Parry in the method which he described for treating lousiness, especially among school children, which was developed during the battle of Britain. The method adopted by his department is described in a memorandum dated June 25, 1942.

A single application of 40 per cent lethane brilliantine is thoroughly applied to the hair, followed one week later by a thorough soap and water washing. Immediately after washing, the hair is dampened with dilute acetic acid and combed to remove all dead nits. There is evidence that this method will not only clear the head of vermin but will protect from further infestation for at least a week.

The lethane brilliantine solution formula is as follows:

| | |
|----------------------------------|--------|
| 40% solution lethane 384 special | 32 oz. |
| Liquid paraffin lev. ad | ½ gal. |

The lethane is a derivative of arsenic preparations made in the United States and shipped to Great Britain for use as insect sprays.

Bristol's Method of Treating Scabies

A similar memorandum to doctors and nurses quotes from a publication of the Ministry of Health on the treatment of uncomplicated cases of scabies,

as well as the disinfection methods and rules for exclusion from school.

Treatment—Scabies can be efficiently treated either with sulfur ointment or with benzyl benzoate. Benzyl benzoate emulsion (25 per cent) is the preparation of choice, and for uncomplicated cases of scabies the treatment of patients during the present emergency should be standardized as far as possible:

(a) The patient is first given a slipper bath in which he is told to soak for 10 minutes; alternatively a shower bath for 5 minutes would suffice. He then soaps himself freely using, if necessary, a rough flannel but not a scrubbing brush, and rinses the soap off.

(b) The patient is then dried and, in a room adequately warmed, benzyl benzoate is applied over the whole body, from the neck downward, with an ordinary flat paint brush $1\frac{1}{2}$ –2 inches wide. The application is allowed to dry and the patient puts on clean underclothes.

(c) Two such treatments should be

given, either on successive days, or within a period of 8 days.

Where a case of scabies occurs in a house, the whole family should, if possible, be treated at the same time.

Disinfection — Clothing, particularly clothing worn next to or touching the skin, and articles of bedding with which a patient comes in contact, such as sheets or blankets, should be properly disinfected if the necessary apparatus is available. Otherwise, underclothing, towels and sheets at least should be washed and aired and outer clothing ironed with a hot iron. Blankets may be ironed or hung in a warm dry place for 2 days.

Exclusion from School—After the first treatment with benzyl benzoate there is no medical reason for excluding an uncomplicated case of scabies from school.

The formula for the benzyl benzoate solution is as follows:

| | |
|---------------------------------------|---------|
| Benzyl benzoate | 25 gm. |
| Lanette Wax SX (emulsifying agent) | 2 gm. |
| Water | 100 ml. |

BOOKS AND REPORTS

Doctor in the Making. *The Art of Being a Medical Student*—By Arthur W. Ham and M. D. Salter. Philadelphia: Lippincott, 1943. 179 pp. Price, \$2.00.

This admirable little book is the result of investigations by a committee of the faculty of the University of Toronto, the object of which was to determine why the records of certain students were not reasonably in accord with the predictions based on their aptitude tests and their scholastic records. There were enough examples of discrepancy between prediction and accomplishment to show that ability and academic preparation do not guarantee success. As a result of the inquiry the committee became advisory rather than investigatory. The authors point out that the amount of information placed before the medical student of today is appalling and the steady stream of knowledge can be mastered only by a mind skilled at learning. This seems to be the first instance in which a university has recognized the duty of teaching students to become competent students in addition to teaching them how to become competent physicians.

The authors are evidently masters of their subject and every page contains good advice. They stress the value of premedical sciences regardless of the field of medicine the student wishes to pursue. They have the faculty of putting things straight from the shoulder. For example, "Knowing an anatomy textbook by heart does not make a good anatomist any more than memorizing the Bible makes a good Christian." We wish space allowed many more quotations. There is much in the book that the professor should take to heart also. A good example of this concerns the organization of one's total

knowledge with each bit in its proper compartment. This may become almost a disease, and such people, including some doctors, "do not hold conversations with their fellow men—they deliver lectures." "The signs of this disease are an ability and a willingness to bore people with long discourses on all subjects."

Much of the book is summed up in Part Three. The authors lay stress on the responsibility of every medical student to become a cultured civilized person in addition to being well versed in the medical sciences. It is the duty of medical schools to help in the cultural development of their students. Some schools have already added some subjects in arts courses for this purpose, though the already crowded curriculum makes it difficult. On the last page is a charming tribute to the old-fashioned country doctor who was respected for his humanity as well as his tolerance. Though "he was suspected of believing in evolution and known sometimes to consort with sinners, he was nevertheless beloved and respected."

The illustrations are excellent. It is hard to commend this book too highly both to students for whom it is written, and to professors. The one criticism is that short as it is, it is still too long for the average student with his crowded curriculum and the many outside activities often forced on him.

MAZÏCK P. RAVENEL

Manual of Industrial Hygiene and Medical Service in War Industries—By Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, William M. Gafar, D.Sc., Editor. Philadelphia: Saunders, 1943. 508 pp. 20 ill. Price, \$3.00.

This timely and important manual

on industrial hygiene is the result of the joint efforts of 16 specialists of the National Institute of Health. It was prepared at the suggestion of the Committee on Industrial Medicine of the Division of Medical Sciences of the National Research Council. It is designed as a source of current and reliable information for industrial physicians, industrial engineers, industrial hygienists, and others who are interested in this highly important, rapidly expanding, and scientifically complex field of public health endeavor.

It is estimated that in 1943 there will be 22 million essential war workers and 18 million others who will be contributing to their basic requirements for healthy living such as food supply, housing, transportation, public utilities, etc. The satisfactory health of those industrially employed has never been of greater importance to the national welfare. The problem has been aggravated by the removal of medical and engineering personnel from industry for direct military service and by the crowding, poor housing, inadequate schools, recreation, and other welfare services, increased mental and nervous strain, increased fatigue, and the introduction of new and serious hazards that have attended the industrial expansion of the national war effort.

Industrial health touches the life of the community in all of its aspects. It cannot be solved by industry alone. It is the joint responsibility of the industry and the community. Unfortunately, it has been a relatively neglected field of public health endeavor. The rewards of intelligent, consecrated efforts on an extensive scale in the field of industrial health should be reflected in increased longevity, prevention of communicable disease, prevention of accidents and resulting disabilities, curtailment of absenteeism, and promotion of sound nutrition, good medical, dental, and nursing care, sanitary

housing, satisfactory environmental sanitation, and positive health.

The book is divided into three parts. Part 1 deals with the organization and operation of the medical, nursing, dental, and emergency treatment facilities necessary for industry. Part 2 deals with the prevention and control of disease in industry and includes chapters on occupational diseases, occupational dermatoses, control of the atmosphere in the working environment, control of respiratory and venereal diseases, industrial psychiatry, industrial fatigue, health education, nutrition, and community as well as plant sanitation. Part 3 deals with the man power problem including the maximum use of man power, women in industry, and absenteeism.

The book is a splendid contribution to essential working knowledge in the field of industrial health work. It can be highly recommended as authoritative, as exceedingly useful, and as of the utmost importance to the success of the national war effort.

MURRAY P. HORWOOD

The Pasteurization of Milk—By G. S. Wilson. New York: Longmans, Green, 1942. 212 pp. Price, \$5.00.

The author, a professor of bacteriology as applied to hygiene, University of London, has described the chief physical, chemical, and bacterial changes brought about by the pasteurization of cow's milk in equipment designed to hold it at about 145° for 30 minutes. The effect of pasteurization on the nutritive value of milk, milk taste, cream line, fertility of animals fed on a milk diet, the destruction of pathogenic organisms, and the extent of milk-borne disease is described in meticulous detail.

The 10 page bibliography is one of the best ever seen on subjects related to why milk should be pasteurized and why pasteurization should not be ob-

jected to, and it indicates the extent to which the author has gone to secure information from available sources in all parts of the world.

There is much repetition in the book but this does not detract from its value. The summaries at the ends of sections or parts thereof are useful.

There is little useful information in the book as to *how* milk should be pasteurized. It can be recommended as good reading for all people who oppose pasteurization and all who wish to review the literature in connection with the historical background of the subject. The book would probably not be particularly useful to the sub-professional health worker unless he wishes to refurbish his repertory of arguments in favor of pasteurization.

E. C. GARTHE

Social Work Year Book 1943—
Russell H. Kurtz, Editor (7th issue).
New York: Russell Sage Foundation,
1943. 764 pp. Price, \$3.25.

Here is a time-saver for the health officer or other administrator in public health, who, busy though he may be with his daily tasks, nevertheless desires to keep abreast of new knowledge and developments within the various areas of his own general field of interest and in closely related fields. This is how the volume would help him to do that:

It reports succinctly in a series of articles the current status of organized activities in particular areas in the field of public health, and each such article is written by a recognized leader in his or her specialty. These particular areas are Tuberculosis, Social Hygiene, Maternal and Child Health, Social and Health Work in the Schools, Mental Hygiene, Medical Care, Medical Social Work, Crippled Children, Blindness and Conservation of Sight, the Deaf and the Hard of Hearing, Psychiatric Social Work, Public Health Nursing,

and one on Public Health generally. Further, there are articles on topics that have much in common with the public health movement, such as the following: Housing and City Planning, Behavior Problems, Adult Education, Parent Education and Child Development, Publicity and Interpretation in Social Work, Rural Social Problems, Labor Legislation and Administration, and Community Organization for Social Work.

The book contains two major divisions: Part One, consisting of 78 signed articles, written by authorities on the aforementioned topics and many others in social work, in a comprehensive meaning of that term, with a list of selected references to the literature of each of these subjects; and Part Two, consisting of 4 directories of national and state governmental agencies and national and state voluntary agencies, whose programs are concerned with or relate to the topical articles constituting Part One.

The *Social Work Year Book* is issued biennially, and this is the seventh of the series. Quite naturally this 1943 edition emphasizes the important events and developments that have occurred in the two year period since the preceding edition was issued, especially those relating to the national defense and war programs.

The volume is excellently indexed. The Index includes in a single alphabetical list the titles of the 78 topical articles in Part One, cross-references to subjects discussed in these articles, names of the governmental and voluntary agencies included in Part Two, and cross-references to the subjects with which these agencies are concerned.

Your reporter believes that the objective of the publisher and editor has been abundantly realized—the presentation of a concise up-to-date encyclopedia of work in the fields of social welfare, public health and kindred mat-

ters—and he recommends that health officers and other health work executives find a place for it on their desks as a ready, convenient source of current information on many subjects with which they are concerned and on others in which they are or may well become actively interested.

It is the opinion of the reviewer that the title of the volume is not adequately descriptive of the breadth of its contents, for the term "Social Work" is still quite narrowly interpreted by many persons as relating chiefly to the case work process for dependent, neglected, disadvantaged, and delinquent individuals and families. He is disposed to believe that more persons would be induced to acquire this excellent compendium of information if a more broadly descriptive title could be found for it.

GEORGE J. NELBACH

The Epidemiology of Rheumatic Fever and Some of Its Public Health Aspects—*By John R. Paul, et al. (2nd ed.) New York: American Heart Association, 1943. 163 pp.*

In this monograph Dr. Paul presents a lucid review of the literature of the past decade regarding the epidemiology of rheumatic fever and its public health aspects. American, British, and Scandinavian publications have been included, as well as his own extensive investigations.

The thirteen chapters are presented in three parts. In addition there are an appendix and a selected bibliography. In Part I, a concise consideration is given to definition and nomenclature in the first two chapters, as well as a brief historical review of the epidemiology of rheumatic fever. In chapters 3 and 4 is documented the evidence for the "Epidemiological Associations Between Rheumatic Fever and Acute Hemolytic Streptococcal Infections," concluding in a general summary, part of which follows:

As one looks broadly at present concepts of the relationship between streptococcal infections and rheumatic fever, which have been reviewed in the last two chapters, it seems obvious for clinical, immunological, and epidemiological reasons that hemolytic streptococcal infections have something to do with rheumatic fever. The strongest evidence in this association is the fact that certain epidemics of so-called streptococcus sore throat, tonsillitis, and perhaps scarlet fever are followed more or less irregularly by groups of cases and even "epidemics" of rheumatic fever.

In Part II, chapters 5-9, there is presented a critical review of some of the most important epidemiological aspects of the disease, comprising the following considerations:

- Chapter V. The Frequency of Occurrence and General Importance of Rheumatic Fever
- Chapter VI. Geographic Prevalence and Climatic Influences
- Chapter VII. Age, Sex, and "Racial" Prevalence
- Chapter VIII. Living Conditions
- Chapter IX. The Rheumatic Family

In Part III there is a timely consideration of the public health aspects of rheumatic fever, with a general summary. Also included are a chapter on "Lines Along Which Public Health Procedures May Develop," by Dr. David D. Rutstein, and a chapter by Dr. T. Duckett Jones on "General Considerations for the Long-term Care of Patients with Rheumatic Fever and Rheumatic Heart Disease." In an excellent, concise general summary, the following provocative concept is of particular interest:

Most of the general statements which appear in this review . . . are based on the assumption that rheumatic fever is a specific disease, or clinical entity. There is room for argument as to the validity of this assumption, particularly as it has been repeatedly brought out in this review, that rheumatic fever is a disease which is closely related to hemolytic streptococcal infections.

The appendix, "Special Methods for Use in the Study of the Epidemiology

of Rheumatic Fever and Its Public Health Aspect," is an important contribution to the value of the volume. Particularly helpful is Dr. Thomas D. Dublin's section on the "Methods of Determination of Incidence and Prevalence of Rheumatic Fever."

This monograph is a much needed addition to the literature on rheumatic fever and will be welcomed by students of the disease. MAY G. WILSON

The Freezing Preservation of Foods—By Donald K. Tressler, Ph.D., and Clifford F. Evens, B.S. New York: Avi Publishing Co., 1943. 763 pp. Price, \$8.00—Domestic, \$8.25—Canada and foreign.

The present volume is essentially a greatly enlarged and improved re-writing of the authors' book *The Freezing Preservation of Fruits, Fruit Juices and Vegetables* which was written six years earlier, and contains a vast amount of new material. Since that time great progress has been made in the application of freezing to all classes of foods, and this volume deals with principles and with practice. In its 21 chapters it covers the theories and the technical aspects of freezing fruits and fruit juices, vegetables, meats, fish, shellfish and dairy products, and discusses in considerable and careful detail the problems concerned with locker plants, packaging materials, nutritive values and vitamin retention, the cooking and serving of frozen foods, and finally a concise treatment of quality control.

An appendix of approximately 70 pages gives the standards and official methods of testing this important class of food materials.

Altogether this work is cyclopedic in scope and represents an enormous amount of work, both original and bibliographic, on the part of the authors. The first three chapters cover in less than 100 pages the principles of

refrigeration and the detailed description of equipment used in different freezing systems. This is presented in a generally clear manner and is especially useful to one who wishes to gain a broad overall picture of modern freezing processes, cold storage, sharp freezing, and especially quick freezing.

The chapter dealing with chemical changes in foods before freezing, while in the chilled state, and after thawing, is particularly well presented. One cannot help expressing admiration for and satisfaction with the factual material given in the chapters on the preparation and adaptability of foods for freezing and the details of the actual freezing process.

As a reference book this volume should be on the shelves of every food technologist, and of every health official or health laboratory director who is concerned with the bacteriological problems of frozen or cold storage foods.

The illustrations are excellent, print easily readable, and paper without annoying gloss. It is a good book and an imposing addition to the literature of food technology. S. C. PRESCOTT

Essentials of Nutrition—By H. C. Sherman and Caroline Sherman Lanford. (2nd ed.) New York: Macmillan, 1943. 442 pp. Price, \$3.50.

This excellent small and up-to-date volume can be recommended unreservedly for the use of public health personnel. The reviewer has frequently recommended it to non-medical friends who ask that they be directed to an informative book on nutrition that will stick to facts and not go all out on the propaganda side. Such a reader would find this book stimulating, though possibly difficult or dull in some places. But he would not emerge from its perusal with any misinformation, and would certainly acquire a profound respect for the rôle of adequate nutrition

in life and health. Dr. Sherman is an advocate of the abundant life in this nutrition question. The standards set up for adequate nutrition might be considered rather luxurious and unattainable by the great majority of the human race. They do represent the ideal, and an attainable one in our nation.

The book is primarily designed for students in nutrition classes, with exercises and suggested readings at the end of each chapter. It follows the usual order of presentation—energy aspects of nutrition, proteins and their amino acids, mineral elements in nutrition, and finally the vitamins. These four aspects of nutrition are preceded by three introductory chapters on the rôle of food in life, and some discussion of metabolism; and the book closes with four special chapters on food and teeth, types of foods, food costs and values, and "Nutrition Policy: Public and Personal."

This last will be of particular interest to public health personnel. Dr. Sherman pleads for the optimum rather than the merely adequate in nutrition and emphasizes the "difference between merely passable health and buoyant health." Both the economic and the educational approaches to this problem are outlined, and some questions of statesmanship discussed.

One of the most valuable features of this volume is the 27 page table at the back on the composition and nutritive value of foods. With its use one can calculate the content of the several nutrients in an individual diet. Practice in the use of this table would be valuable to every member of a health department, all of whom should be informed health educators for better nutrition.

D. F. MILAM

Principles of Medical Statistics—
By A. Bradford Hill (3rd ed.) London: Lancet, 1942. 189 pp. Price, \$2.25.

The third edition of Dr. Hill's book differs in no material respect from the

previous edition. As the author states in the preface to this latest edition "Preoccupation with some of the statistical problems of total war and the national urgency to save paper have made any (such) expansion impossible and I have confined myself to a few verbal alterations."

For the medical man with little or no knowledge of statistics, Dr. Hill's book serves as one of the best introductions to the subject. Even for those who have had some statistical dealings its clear exposition of the logical principles involved in the ordinary statistical procedures deserves a careful reading.

PAUL M. DENSEN

Healthy Babies Are Happy Babies
—By Josephine Hemcnway Kenyon, M.D. Boston: Little, Brown, 1942. 343 pp. Price, \$1.50.

This is the third edition of Dr. Kenyon's book by this title and changes have been made which bring it up-to-date in many respects. The newer fish liver oils, vitamin concentrates, sulfa drugs, and non-profit hospital service plans are touched upon. The full discussions of habit training and physical and mental development are, for the most part, in accord with modern concepts. But nutrition is not the author's forte. There is insufficient discussion of the basic principles of nutrition to enable parents to make the best use of the sample menus with their many substitutions.

The organization of the material in chapters relating to age levels from the prenatal period to the age of three years makes it easily accessible. Discussions of the health of the mother are woven into each section.

The chapters on emergencies and diseases of childhood are well done and are timely now that mothers must assume more responsibility for minor illness due to the doctor shortages.

JESSIE M. BIERMAN

Venereal Disease, Diagnosis, Treatment and Laboratory Methods—*Department of Pensions and National Health, 111 Avenue Road, Toronto, Canada.* 98 pp.

This pamphlet was prepared by a committee of thirty-two physicians convened by the Health League of Canada. The names of the members of the committee guarantee the soundness of the contents of the report.

The volume is a handbook for physicians who treat venereal diseases. It gives the essentials of the diagnosis and treatment of these diseases. On account of the limitations of space many details are omitted but if every physician treating syphilis, gonorrhea, chancroid, lymphogranuloma inguinale and granuloma inguinale could be familiar with and apply all that is given in this brochure the treatment of these diseases would be on a very much higher plane than it occupies at the present time.

As might be expected there are some statements made with which many authorities would not agree. There is given a prescription for an astringent urethral irrigation which, in the opinion of many urologists, has no place in the treatment of gonorrhea. It might have been better to omit the details of the intermittent treatment of early syphilis, but in fairness to the committee it should be stated that it does not recommend the intermittent treatment.

The booklet is to be recommended to all physicians who are called upon to treat the venereal disease.

F. L. ROBERTS

A Study of Patients Discharged Alive from Tuberculosis Sanatoria in 1933—*By Jessamine S. Whitney and Mary V. Dempsey. Social Research Series—No. 8. New York: National Tuberculosis Association, 1942.* 58 pp. Single copies free.

This study represents a joint effort

of the National Tuberculosis Association and the Division of Vocational Rehabilitation, U. S. Office of Education. The purpose of the study is "an attempt to answer the question, 'What type of patient who has had sanatorium care is feasible for and will profit most from intensive organized service?'" Seventy-five public sanatoria in sixteen states and the District of Columbia voluntarily coöperated in the undertaking.

Some of the difficulties to be encountered in a problem of this kind are discussed, and one very important section of the report deals with recommendations prepared as the result of experience acquired in this study.

This report will be of value to all persons interested in tuberculosis and especially to those who have the planning and execution of rehabilitation programs for tuberculous individuals. More complete information in this field is very much to be desired and this is a worth while addition to our knowledge in this respect.

H. C. STEWART

Public Health in Bridgeport, Conn.—Report of a Public Health Survey by the Department of Health, Yale University School of Medicine, 1942. 91 pp.

Undertaken under the able leadership of Professor Ira V. Hiscock, this report, in common with other studies made by the Department of Health of the Yale University School of Medicine, is replete with meaningful information concerning the health situation of the community.

The report discusses in some detail the present status, and in some instances the past history, of activities and services in the various phases of public health endeavor: vital statistics, water supply, sewage disposal, refuse collection and disposal, housing, milk control, food, sanitation, control of

communicable diseases, venereal diseases, tuberculosis, maternal and child health, school health, public health nursing, and special problems such as crippled children, hearing and vision, nutrition, mental hygiene, cancer, and heart disease. There are also brief discussions of community health education, organized care of the sick, and the Community Chest and Council of Social Agencies.

Each major section has a summary with pertinent suggestions as to what ought to be done to correct weaknesses. The dominant weakness is the lack of an adequate staff of well trained people.

The report concludes with three pages devoted to "Tentative Suggested Recommendations for a Long-Term Program."

To those interested in the development of public health over a period of years the report sounds a sad note in that it shows clearly how a health organization and program which stood in the front ranks three decades ago has retrogressed and failed to keep pace with the times until now it has reached its lowest ebb. Fortunately such examples are rare. The retrogression in organization and program is spoken of quite frankly but the underlying causes responsible for the failure are not made clear except perhaps there is a hint to the reader as the report calls attention to the weakness of the community health education program.

The report is well worth reading. It would have been easier reading, and just as effective, with fewer statistics. The detailed statistical information might well have been placed in an appendix.

As an experience for students of public health the survey was doubtless of very real value. The written report also constitutes a useful document for teaching. If the report is designed to bestir the people of Bridge-

port to effective action it leaves much to be desired. It lacks forcefulness and proper emphasis. All the suggestions for needed improvements are included, but they do not stand out in bold relief and all too frequently they are offered as suggestions rather than as clear-cut, definite, forceful recommendations.

CARL E. BUCK

Mental Health in College—By Clements C. Fry, M.D., with the collaboration of Edna G. Roston. New York: Commonwealth Fund, 1942. 382 pp. Price, \$2.00.

In this analysis of the records of Yale students with emotional difficulties, the authors present interesting case histories illustrating the various factors entering into the development of emotional problems over a 10 year period. They also explain clearly, and at length, their significance to educators and to those responsible for the early training of students.

Dr. Fry demonstrates and explains how important are such factors as the family, ignorance of sex changes in a maturing youth, scholastic deficiencies, and the social strivings and disappointments of young people, even in a university environment as nearly perfect as that of Yale. Studies are also presented of the special problems developing among students during each of the 4 years of undergraduate work, and of those arising in the graduate schools. The psychiatric cases, though relatively few, are also analyzed.

In order that he may understand the environments in which these difficulties develop, the reader is told a good deal about life at Yale.

Reports on the analyses of case records are often dry and difficult to read. Not so, this book. Though it is long, requires careful reading, and even study, it is well written and contains valuable material.

Those living and working with col-

lege students will find in this book a most sympathetic understanding of their problem cases. To school administrators and to educators in gen-

eral, this study will present a challenge to devote more study to this field of emotions.

GEORGE T. BLYDENBURGH

BOOKS RECEIVED

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- TEXT-BOOK OF MEAT HYGIENE. By Richard Edelman. 8th rev. ed. By John R. Mohler and Adolph Eichhorn. Philadelphia: Lea & Febiger, 1943. 468 pp. Price, \$5.50.
- SANITARY PRODUCTS. THEIR MANUFACTURE, TESTING AND USE. By Leonard Schwarcz. New York: MacNair-Dorland, 1943. 291 pp. Price, \$5.00.
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- MEDICO-LEGAL BLOOD GROUP DETERMINATION, THEORY, TECHNIQUE AND PRACTICE. By David Harley. New York: Grune & Stratton, Distributors, 1943. 119 pp. Price, \$3.50.
- HEART DISEASE IS CURABLE. By Peter J. Steincrohn. New York: Doubleday-Doran, 1943. 193 pp. Price, \$1.98.
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- A GUIDE TO PRACTICAL NUTRITION. A Series of Articles on Nutrition, Sponsored by the Committee on Nutrition and Deficiency Diseases of the Philadelphia County Medical Society, Philadelphia, Pa. Reprinted from Philadelphia Medicine, 1941-1942. 98 pp.
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- DO YOU WANT TO BE A NURSE? By Dorothy Sutherland. New York: Doubleday-Doran, 1942. 186 pp. Price, \$2.00.
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| A. Away We Go..... | .28 |
| B. Happy Times | .80 |
| C. In Storm and Sunshines..... | .84 |
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| E. Here and There..... | .92 |
| F. Around the Year | .96 |
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A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

When Johnnie Comes Marching Home—Every man and woman among us should heed this editorial which concludes that although the value of diphtheria prophylaxis is proved beyond doubt, experience in England and Australia with the *gravis* form should convince us that the present state of knowledge concerning the control of diphtheria is not conducive to a state of complacency—a state in which most of us find ourselves, I suspect.

ANON. Grave Diphtheria. J.A.M.A. 122, 3:176 (May 15), 1943.

"Eat These Foods Every Day"—Nutritionists occasionally leave the impression that adequate diets are dependent upon a rigid food pattern. In the army they have found it necessary, and possible, to make a variety of substitutions for the "must" foods.

BERRYMAN, G. H., and HOWE, P. E. Some Nutritional Principles of Mass Feeding. J.A.M.A. 122, 4:212 (May 22), 1943.

Reminder That Vaccinia Works Faster—Antibodies against vaccinia begin to appear at the end of the first week following cutaneous vaccination, and reach a maximum at the close of the 3rd week; in variola the same antibody response occurred 26 to 30 days after infection.

BLATTNER, R. J. Antibody-Response to Cutaneous Inoculation with Vaccinal Virus in Human Subjects, Utilizing the Egg-Protection Technic. J. Immunol. 46, 4:207 (Apr.), 1943.

Toward Intelligent Eating—Food habits, food advertising, food processing, food waste, and a few other factors that interfere with good nutrition are subjected to telling scrutiny.

CARLSON, A. J. Some Obstacles in the Path Towards an Optimum Diet. Science. 97, 2522:385 (Apr. 30), 1943.

Whooping Cough — Killer of Babies—Though whooping cough mortality rates have declined markedly in recent years, it is not likely that prophylactic vaccinations have been widely enough employed to have exerted any great influence upon this decline, and should the mortality rates continue to go down it will be extremely difficult to assess the relative influence of the future extension of this preventive measure.

DAUER, C. C. Reported Whooping Cough Morbidity and Mortality in the United States. Pub. Health Rep. 58, 17:661 (Apr. 23), 1943.

Hodge-Podge Health Education—Among other examples, transcripts of nursing visits record the advice of one nurse to Mrs. A. to nurse the baby on alternate breasts, and of another nurse to Mrs. B. to nurse the baby on both breasts at each feeding. What will Mrs. A. and Mrs. B. think if they compare notes? And who would blame them for their opinions?

DERRYBERRY, M., and BROCKETT, G. S. Preserving Confidence in Health Education. Pub. Health Nurs. 35, 5:244 (May), 1943.

More TB Case Finding—Records of drafted boys deferred because of chest x-ray findings and reported to the state department of health are turned over to local officials for follow-up. Of 3,112 so deferred only 417 had been previously reported. Completed histories of 1,540 not earlier reported, indicated that 78 per cent were affected with TB in some form.

EAKINS, W. T. Tuberculosis in War Time in New Jersey. *Pub. Health News.* 26, 8:225 (Apr.), 1943.

War-Work and TB—Chest examinations of more than 15,000 industrial employees revealed 0.61 per cent with evidence of clinically significant pulmonary tuberculosis: apparently arrested 2.92 per cent. Increased tempo of industrial production with all its social and economic overtones calls for tuberculosis control programs throughout all industries.

EDWARDS, H. R. Tuberculosis in Industry. *Am. J. Med. Sci.* 205, 4:571 (Apr.), 1943.

Rats and Typhus—Rat-flea transmitted typhus cases are reported in southern United States in ever increasing numbers. Rat proofing of buildings and destruction of garbage would do away with excess rat populations and stop the spread of this needlessly endemic disease. A unit of the U. S. Public Health Service is cooperating with state authorities to this end.

ESKEY, C. R. Murine Typhus Fever Control. *Pub. Health Rep.* 58, 16:631 (Apr. 16), 1943.

Mechanism of Protection—Vaccination with influenza virus not only stimulates production of circulating antibodies but increases the capacity of nasal secretions to neutralize virus. If you want to know some of the implications of this finding you must search out this stimulating paper in the magazine noted below.

FRANCIS, T., JR., *et al.* The Effect of Subcutaneous Vaccination with Influenza Virus upon the Virus-Inactivating Capacity of Nasal Secretions. *Am. J. Hyg.* 37, 3:294 (May), 1943.

After the Uncoöperative Patient Departs—Half the tuberculous patients who left three city sanatoria against advice in 1935 were found, 7 years later, to have died. Another third had relapsed but were still hanging on.

This is a public health problem of the first magnitude, wisely concludes the writer.

GUEST, K. R. Follow-up of the Known Tuberculous Patient. *Am. Rev. Tuberc.* 47, 3:325 (Mar.), 1943.

Liver for Blood Donors—Of interest to all blood donors—as who of us under 60 isn't—is this discussion which concludes that good nutrition favors rapid blood regeneration. Among the proteins rich in iron, liver, kidney, and oysters seem to be featured.

McKIBBIN, J. M., and STARE, F. J. Nutrition in Blood Regeneration (and) TURNER, D. F. Dietary Recommendations for Blood Donors. *J. Am. Diet. Assoc.* 19, 5:331 (May), 1943.

TB in the Publicly Assisted—Among 5,000 unemployed adults examined and reexamined for tuberculosis, only one of the originally negative cases was later found tuberculous, and among the healed cases only one was found to be reactivated 12 months later. Annual reexaminations of these people would seem not to be economically justified.

MILLER, R. E., and HENDERSON, B. The Epidemiology of Tuberculosis in a Low Income Group. *Am. Rev. Tuberc.* 47, 3:334 (Mar.), 1943.

Remember This One Next Winter—Oral administration of heat-killed "cold" vaccines had no influence on the incidence or severity of common colds when tried upon volunteers from the Visiting Nurse Service of New York City.

SIEGEL, M., *et al.* A Study of the Value of a Mixed Bacterial "Oral Cold Vaccine." *Am. J. Med. Sci.* 205, 5:687 (May), 1943.

Syphilis Discovery Rates—Substantial reductions in congenital syphilis are reported from Baltimore. Despite better case finding facilities, no new cases were unearthed among white children under 5, and only 12

cases among Negroes during the last 3 years. Among white adults a significant decline in annual discovery rates occurred, but there was no convincing evidence of the same trend among the colored.

TURNER, T. B., *et al.* Studies on Syphilis in the Eastern Health District of Baltimore City. *Am. J. Hyg.* 37, 3:273 (May), 1943.

"Medical Treatment for Every Briton in Whatever Form He Requires It"—According to the Beveridge

report no satisfactory social security scheme can be devised except on the following assumptions: (a) school children's allowances; (b) health and rehabilitation services for everyone; (c) maintenance of employment. What assumption (b) means in terms of British health and medical services is discussed in detail.

UNDERWOOD, E. A. The Beveridge Report and the Health Services. *Pub. Health.* 56, 8:89 (May), 1943.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND SEVENTY-SECOND ANNUAL BUSINESS MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

RATES QUOTED BY NEW YORK HOTELS

*Wartime Public Health Conference and Seventy-second Annual
Business Meeting—October 12-14, 1943*

| | Rooms With Bath | |
|---|-----------------|--------------|
| | Single | Double |
| <i>Headquarters:</i> | | |
| Hotel Pennsylvania, 7th Avenue and 33rd Street | \$3.85- 8.80 | \$5.50- 9.90 |
| <i>Hotels near Hotel Pennsylvania:</i> | | |
| Governor Clinton, 31st Street and 7th Avenue | 3.30- 5.50 | 4.40- 7.70 |
| McAlpin, Broadway and 34th Street | 3.30- 6.60 | 4.95- 8.80 |
| New Yorker, 34th Street and 8th Avenue | 3.85- 8.80 | 5.50-11.00 |
| <i>Selected Hotels Outside Pennsylvania Zone:</i> | | |
| Ambassador, Park Avenue and 51st Street | 5.00- 8.00 | 7.00-10.00 |
| Astor, Broadway and 44th Street | 3.00- 5.00 | 5.00- 8.00 |
| Barbizon (Women), Lexington Avenue and 63rd Street | 3.00- 3.50 | 4.50- 5.50 |
| Biltmore, Madison Avenue and 43rd Street | 5.50-12.00 | 7.50-14.00 |
| Bristol, 129 West 48th Street | 2.50- 4.00 | 3.50- 6.00 |
| Commodore, Lexington Avenue and 42nd Street | 3.50- 5.50 | 5.50- 8.80 |
| Cornish Arms, 311 West 23rd Street | 2.25- 2.50 | 3.50- 4.00 |
| Fifth Avenue Hotel, 24 Fifth Avenue (9th Street) | 3.75- 5.00 | 5.00- 7.00 |
| George Washington, 23rd Street and Lexington Avenue | 2.00- 4.00 | 3.50- 6.00 |
| Lexington, 48th Street and Lexington Avenue | 4.00- 6.00 | 5.50- 8.00 |
| Lincoln, 8th Avenue and 44th Street | 3.00- 5.00 | 4.00- 8.00 |
| Midston House, 22 East 38th Street | 3.00- 3.25 | 4.00- 4.50 |
| New Weston, Madison Avenue and 50th Street | 4.00- 6.00 | 6.00- 9.00 |
| Paramount, 46th Street, West of Broadway | 2.50- 4.50 | 4.00- 8.00 |
| Park Central, 7th Avenue and 55th Street | 4.00- 5.00 | 6.00- 7.00 |
| Parkside, 18 Gramercy Park South | 2.50- 3.00 | 5.00 |
| Piccadilly, 227 West 45th Street | 2.50- 4.00 | 3.50- 6.00 |
| Prince George, 14 East 28th Street | 2.50- 4.00 | 3.50- 7.00 |
| Roosevelt, Madison Avenue and 45th Street | 4.50- 8.00 | 6.50-12.00 |
| St. Regis, Fifth Avenue and 55th Street | 6.00- 7.00 | 7.00-11.00 |
| Seymour, 50 West 45th Street | 4.00- 5.00 | 5.50- 6.00 |
| Shelton, 49th Street and Lexington Avenue | 3.50- 5.00 | 5.00- 7.00 |
| Waldorf-Astoria, 50th Street and Park Avenue | 7.00-10.00 | 10.00-15.00 |
| Wellington, 7th Avenue and 55th Street | 2.50- 4.00 | 3.50- 6.00 |

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Edward P. Cutter, M.D., Box 209, DeFuniak Springs, Fla., Walton-Okaloosa County Health Officer
 Eugene K. Enns, M.D., Spartanburg County Health Dept., Spartanburg, S. C., Asst. Surgeon, (R) U. S. Public Health Service
 Harry S. Fein, M.D., M.S.P.H., 1648 S. Springfield Ave., Chicago, Ill., District Health Supt. and Epidemiologist, State Health Dept. (on military leave)
 Fernando H. Janer, Boringuea 7, Rio Piedras, Puerto Rico, Medical Officer, Dept. of Health
 J. Lastra-Charriez, M.D., Gaguas, Puerto Rico, Health Officer, Dept. of Health
 Vincent B. Marquis, M.D., 1405 Clinton Blvd., Bloomington, Ill., Health Officer
 Robert N. McClellan, Board of Health Office, Needham, Mass., Health Officer
 Herbert T. Meehan, M.D., 280 W. 5th St., Pomona, Calif., Senior Physician, Los Angeles County Health Dept.
 Marion L. Montgomery, M.D., North Church St., Louisville, Miss., Director, Winston County Health Dept.
 Kinchen C. Moore, M.D., Currituck, N. C., District Health Officer, Currituck-Dare Health Dept.
 James T. Newton, M.S., 407 City Bldg., Wichita, Kans., Asst. Director, Public Welfare Dept.
 Jose Polanco-Gonzales, M.D., Elena 25, Santurce, Puerto Rico, Medical Officer, Public Health Unit
 Ethel G. Reuter, M.D., 510 Court St., The Dalles, Ore., Director, Wasco-Sherman County Public Health Dept.
 George E. Riley, M.D., M.P.H., P. O. Box 143, Jackson, 102, Miss., Director, City-County Health Dept.
 Arthur L. Ringle, M.D., C.P.H., Court House, Walla Walla, Wash., District Health Officer
 Leo B. Skeen, M.D., P. O. Box 1268, Statesville, N. C., Iredell County Health Officer
 Benjamin A. Stafford, Jr., M.D., Rolling Fork, Miss., Director, Issaquena-Sharkey County Health Dept.
 Milton Terris, M.D., State Dept. of Health, Albany, N. Y., Apprentice Epidemiologist

Laboratory Section

Clara J. Fillmore, 1516 Auburn St., Rockford, Ill., Serologist, State Dept. of Public Health

Capt. Jack H. Friedman, M.C., Station Hospital, Camp Swift, Tex., Sanitary Corp., Army of the U. S.
 Serge G. Lensen, Ph.D., Michigan Department of Health Laboratories, Lansing, Mich., Virologist
 Charles A. Mitchell, Animal Diseases Research Institute, Mountain Rd., Hull, P. Q. Canada, Chief, Division of Animal Pathology
 James M. Murphy, V.M.D., Dairy Research Station, Sussex, N. J., Veterinarian
 Ella D. Newell, 3659 Minnesota Ave., S.E., Washington, 19, D. C., Serologist, Arlington County Health Dept. Laboratory
 Joseph Novak, 2912 Ellis Ave., Chicago, Ill., Business Manager, Michael Reese Research Foundation
 Rudolf Osgood, M.D., 59 Greenlawn St., Fall River, Mass., Bacteriologist and Chemist, Dept. of Health
 Robert Rustigian, Ph.D., Sc.M., 146 Salem St., Medford, Mass., Student
 Elmer W. Smith, M.D., 439 E. Monterey Ave., Stockton, Calif., Pathologist, San Joaquin County Hospital
 Arnold F. Strauss, M.D., St. Vincent's Hospital, Norfolk, Va., Director of Laboratory
 Donald L. Welch, M.S., State Water Laboratory, Iowa City, Iowa, Chief Water Analyst
 Sgt. Robert M. Wiley, 2nd Service Command Laboratory, 90 Church St., New York, N. Y.

Vital Statistics Section

Miguel A. Gallardo, Santa Tecla, El Salvador, C. A., Chief, Statistical Dept., Dept. of Public Health
 Jose L. Janer, 3 Santa Ines St., Rio Piedras, Puerto Rico, Chief, Bureau of Vital Statistics, Insular Dept. of Health

Engineering Section

Nelson Biaggi, C.P.H., 18 Mairn St., Santurce, Puerto Rico, Asst. in Sanitary Sciences, School of Tropical Medicine
 Murray A. Getz, 111 Dean St., Woodstock, Ill., Asst. Public Health Engineer, State Dept. of Public Health
 Gordon E. McCallum, C.E., 4702 Chestnut St., Bethesda, Md., Acting Chief Sanitary Engineer, Office of Civilian Defense
 George S. Russell, C.E., 4903 Delmar Blvd., St. Louis, Mo., Visiting Lecturer, Sanitary Engineering, Univ. of Missouri

Walter F. Snyder, 3127 Erie St., Toledo, Ohio,
Supt., Bureau of Sanitation, Health Dept.
Clifford C. Williams, 710 Grant Ave., Joliet,
Ill., Sanitary Engineer, State Dept. of
Public Health

Industrial Hygiene Section

John R. Erwin, M.D., 1400 Boren, Seattle,
Wash., Asst. Medical Director, Boeing Air-
craft Co., Seattle and Renton Div.
Murl E. Fulk, M.D., 245 E A Avenue, Glen-
dale, Ariz., County Physician
Lucille M. Harmon, R.N., 51 W. Warren,
Detroit, Mich., Supervisor and Industrial
Consultant, Detroit Visiting Nurse Assn.
Steve P. Marsh, State Board of Health,
Raleigh, N. C., Asst. Industrial Hygiene
Engineer
William M. Rablin, 523½ 15th St., Sacra-
mento, Calif., Sanitary Inspector, City
Health Dept.
William E. Russell, M.D., 2812 33rd Ave.
South, Seattle, Wash., Medical Director,
Boeing Aircraft Co., Seattle and Renton
Div.

Food and Nutrition Section

Mary F. Baldwin, Provincial Board of
Health, Victoria, B. C., Canada, Consultant
in Nutrition
Otto A. Bessey, Ph.D., Foot of E. 15th St.,
William Park Lab., New York, N. Y.,
Director, The Public Health Research
Institute
Dr. Guillermo Quesada Bravo, Calle de la
Reyna 100, Villa Alvaro Obregon, D. F.,
Mexico, Director, Bureau of Animal
Industry
M. Jeannette Clifton, M.S., 3031 Park Ave.,
Richmond, 21, Va., Nutritionist, State
Dept. of Health
Einar M. Haglund, 310 Cedar St., New
Haven, Conn., Student, Yale Dept. of
Public Health
Horace D. Pritchett, V.M.D., 201 Varick St.,
Room 1200, New York, N. Y., Asst. Food
and Drug Inspector, U. S. Food and Drug
Admin.
John L. Russell, P. O. Box 1, Effingham, Ill.,
Dairy Sanitarian, City of St. Louis
Bernard E. Silver, Ph.D., 476 Clinton Ave.,
Brooklyn, N. Y., Teacher, Food Trades
High School
Orosina Vazquez de Nevarez, Bureau of Ma-
ternal and Inf. Hygiene, Dept. of Health,
Sanurce, Puerto Rico, Asst. Directress
Nutritionist
Capt. A. LeRoy Voris, Sn.C., 1318 Sanitary
Unit, Post Headquarters, Camp Pickett,

Va., Food and Nutrition Officer, U. S.
Army

Telford W. Workman, D.V.M., 745 North
Ave., Bridgeport, Conn., Production and
Technical Director, N. E. Div., The
Borden Co.

Maternal and Child Health Section

Adele Hillman, 418 McKinley Ave., Bridge-
port, Conn., Physical Therapy Technician,
State Dept. of Health
Samuel M. Wishik, M.D., Board of Health,
Honolulu, T. H., Acting Director, Bureau
of Maternal and Child Health

Public Health Education Section

M. Heloise Adler, M.A., District Health
Center, Dover-Foxcroft, Me., Dental Hy-
gienist, Div. of Dental Health
Benson M. Boutte, 2536 S. Galvez St., New
Orleans, La., Instructor, Albert Wicker High
School
John D. LeMar, M.D., College of Medicine,
Univ. of Nebraska, Omaha, Nebr., Chief,
Student Health Service
Ruth K. Lowther, 1512 Grove, Topeka, Kans.,
Supervisor of Visual Education, State Board
of Health
L. Rose McInturff, M.S., Washington County
Health Dept., Jonesboro, Tenn., Health
Education Coördinator
Duncan W. McKinlay, M.D., Finch Memorial
Hospital, 212 Pioneerway, Pullman, Wash.,
Supt., Student Health Service
Kenneth E. Pohlmann, 3420-29th N.W.,
Washington, D. C., Senior Health Services
Specialist, Farm Security Admin.
Camille M. Sonnefeld, R.N., 94 Washington
Ave., Wheeling, W. Va., Medical Investi-
gator of Ohio County, Dept. of Public
Assistance
Frank H. Vail, D.D.S., 99 Pratt, Hartford,
Conn., Supervisor of Dental Health Edu-
cation, Board of Education.

Public Health Nursing Section

Irma Bowling, C.P.H., Bedford County
Health Dept., Shelbyville, Tenn., Senior
Public Health Nurse
Maude B. Carson, 1219 S. 7th, Springfield,
Ill., Chief, Div. of Public Health Nursing,
State Dept. of Public Health
Rhoda M. Foster, R.N., 3636 College Ave.,
Fort Worth, Tex., Field Supervisor, City
Dept. of Health and Welfare
Kathryn M. Frankenfield, 314 N. 37th St.,
Philadelphia, Pa., Supervisor, Visiting Nurse
Society of Philadelphia
Margaret D. Frantz, 1601 Botton St., Balti-

more, Md., Educational Director, Instructive Visiting Nurse Assn.
 Mary Hoffman, 45 South Main St., Ashley, Pa., Supervisor, Visiting Nurse Assn. of Wilkes Barre
 Maxime N. Masters, R.N., 183, Marlette, Mich., Staff Nurse, Sanilac County Dept. of Health
 Ruth M. McCullagh, 1337 Grove, Berkeley, Calif., District Supervising Nurse, State Dept. of Public Health
 Dorothea McKee, R.N., Sunderland Court, Apt. A-5, Powelton Ave., Philadelphia, Pa., Supervisor, The Visiting Nurse Society
 Pauline F. Rogers, R.N., 1012 Demerius St., Durham, N. C., Supply Nurse, County Field Work, Durham County Health Dept.
 Esther M. Stolzmann, Public Schools, Tucson, Ariz., School Nurse
 Viola M. Vreeland, Bannock County Health Unit, Pocatello, Ida., Staff Nurse, State Dept. of Health

Epidemiology Section

D. E. H. Cleveland, M.D., C.M., 2700 Laurel St., Vancouver, B. C., Canada, Acting Director, Div. of Venereal Disease Control, Provincial Board of Health
 Theodore S. Drachman, M.D., M.S.P.H., 331 Depew Ave., Buffalo, N. Y., Asst. District Health Officer, State Dept. of Health
 Capt. John J. Goldsberry, M.C., Station Hospital, Fort Huachuca, Ariz., Venereal Disease Control Officer
 Dr. Carlos Rodriguez-Escarcega, Ave. D 676, Tijuana B. Cfa., Mexico, Dept. of Public Health of Mexico
 Dr. Luis Aranda del Toro, Nayarut, 57, Mexico, D. F., Mexico, Dept. of Public Health of Mexico

Dr. Sadoc Vasquez-Martinez, Oficina de Supervision Tecnica Del Dep., de Salub. Publica, Mexico, D. F., Mexico, Dept. of Public Health of Mexico

School Health Section

Iva B. Bennett, M.A., 78 Deerpath, Roslyn Heights, N. Y., Supervisor of Health Education, Board of Education, Baldwin, N. Y.
 Mabel A. Geddes, M.D., Orange County Health Dept., Santa Ana, Calif., Supervisor of Health, Orange County Schools
 E. Stanley Grannum, M.D., 2202 Hampton Ave., Columbia, S. C., Medical Director, Good Samaritan-Waverley Hospital
 Mabel F. Wood, D.D.S., 1230 Maison Blanche Bldg., New Orleans, La., Dentist, Orleans Parish School Board

Unaffiliated

Robert G. Beaumier, M.A., 1412 Smith Tower, Seattle, Wash., Administrative Asst., State Dept. of Health
 Roberto Levi-Castillo, M.S., P. O. Box 759, Guayaquil, Ecuador, S. A., Research Worker, Malaria Control, National Welfare Society
 Vernon B. Link, M.D., 15 Pine St., U. S. Public Health Service, New York, N. Y., Passed Asst. Surgeon
 Evelyn A. Watson, R.F.D. 1, St. Albans, W. Va., Nurse

DECEASED MEMBERS

Harry Goldman, M.D., M.P.H., Boston, Mass., Elected Member 1943, Epidemiology Section
 Martin H. Knutsen, M.S., State College, Pa., Elected Member 1919, Unaffiliated

CHANGES IN THE APPRAISAL FORM FOR COMMUNITY HEALTH WORK

Dr. Henry F. Vaughan, Chairman of the Committee on Administrative Practice, has announced recent decisions of the Committee on Administrative Practice with respect to the appraisal of local health work which will be of interest to health officers over the country.

Up until recently there have been two distinct forms, one the *Appraisal Form for Local Health Work* (1938 edition), and the other the *Evaluation Schedule*, used in connection with the National Health Honor Roll, and, prior to that,

in the Interchamber Health Conservation Contest. As these two forms called for different types of information and were set up on different principles, there has been confusion over their uses. In order to avoid this confusion, the Committee on Administrative Practice has decided to limit appraisal practices to one form.

The *Evaluation Schedule* has been selected as the surviving form. The *Appraisal Form for Local Health Work* has, therefore, been discontinued and

will not be revised or reprinted. The few remaining copies on hand will be sent out to those who request them.

The *Evaluation Schedule* will be revised to some extent and reissued this fall. It will be recognized hereafter as the official form for appraisal purposes. It will be used both in connection with the National Health Honor Roll and for other purposes as may be needed.

The Committee on Administrative Practice has also approved the preparation of a *Guide to the Evaluation Schedule* which it is expected will be published in the fall. One further decision was to approve the issuance of a booklet to be known as "Health Practice Indices." This will consist of a series of charts showing the range of units of practice for cities and counties which have submitted schedules for the years 1941 and 1942. It is believed that this pamphlet will serve a most useful reference purpose to health officers as it will depict practices over the country as represented by those communities which have participated in

the National Health Honor Roll in the last two years.

The preliminary revision of the *Evaluation Schedule*, the preparation of the *Guide*, and the compilation of the *Health Practice Indices* are now under way in the hands of the subcommittee on Manual and Appraisal of Local Health Work.

The material will be submitted for approval at a projected meeting of the subcommittee in the late summer, and it is hoped that all material will be available in published form before the end of the year.

CLOSING DATE FOR SUBMITTING

FELLOWSHIP APPLICATIONS

Members who may be interested in applying for Fellowship in the A.P.H.A. are hereby advised that Fellowship applications should be received by the Central Office not later than August 1, to insure consideration at the Wartime Public Health Conference and 72nd Annual Business Meeting to be held in New York October 12 to 14.

WORKSHOP ON ADJUSTMENTS DURING WARTIME OF SCHOOL HEALTH PERSONNEL

The most pressing school health problem today is the adjustment of personnel to meet the war emergency. The School Health Section, in coöperation with the Food and Nutrition Section and the American School Health Association, will conduct a Workshop on this subject in connection with the Wartime Conference in New York City, October 12-14. The Workshop will be

divided into three groups for discussion of problems in (a) rural areas, (b) medium size communities, and (c) large cities.

Registration for these working sessions is limited to 30 for each of the three groups. Complete details may be obtained from Dr. George M. Wheatley, Secretary, School Health Section; 1 Madison Avenue, New York, N. Y.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y.

POSITIONS AVAILABLE

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

INDUSTRIAL HYGIENISTS

The Research Section of the Division of Industrial Hygiene, National Institute of

Health, Bethesda, Md., needs chemists, physicists, and medical technicians, as well as laboratory assistants in these fields. There is also opportunity for persons without college education, specific training or experience who are interested in such positions. Women now form one-third of the employees in the Research Section.

Merit System for Personnel Administration, Delaware, is accepting applications for position of Deputy State Health Officer in Delaware State Board of Health. Salary range \$3,600 to \$4,200. Applications accepted until further notice. Those interested should communicate with Merit System Supervisor, P. O. Box 1911, Wilmington, Delaware, or State Board of Health, Dover, Del.

Sanitarian wanted: Starting salary \$1,800 per year with travel allowance of \$50 per month. Man must have own car. Bachelor's degree followed by at least one year's course or its equivalent in subjects necessary for one entering the public health field, or an engineering degree plus one year's experience in sanitary or public health engineering required. A course in public health training may be considered as an equivalent for a part of the experience requirement. Apply Dist. Dept. of Health No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Wanted: Two physicians, immediate appointment, full-time venereal disease clinician, conduct several small clinics rotating schedule. Experience preferred. Salary \$3,600 plus actual expense not to exceed \$1,200. Write State Health Department, Santa Fe, New Mexico.

The Board of Health, Territory of Hawaii, announces applications will be received for positions as Medical Technician in their public health laboratories. The positions: Civil Service Classifications, SP-5, salary range \$154.17 to \$192.92 per month; SP-6, \$172.50 to

\$217.50 per month, subject to retirement deductions under Hawaiian Civil Service System, plus graded bonus for the period of time such bonus remains in effect for Territorial Government employees.

Interested persons may make written application to Board of Health, Territory of Hawaii, P. O. Box 3378, Honolulu, T. H.

Notice of an expected vacancy for an Industrial Hygiene Engineer in the Los Angeles County Health Department has been received. Those interested should communicate with Dr. H. O. Swartout, Acting County Health Officer, Los Angeles, Calif.

Announcement is made of the following examinations to be held by the State Personnel Board, Seattle, Wash., for positions in the State Department of Health and County Health Departments:

| Position | Salary Range | |
|--|--------------|---------|
| | Entrance | Maximum |
| Bacteriologist | \$135 | \$160 |
| Laboratory Assistant .. | 125 | 145 |
| District Public Health Officer, II | 325 | 425 |
| Public Health Nurse... | 145 | 170 |
| Asst. Venereal Disease Investigator | 150 | 190 |
| General Sanitarian | 160 | 200 |
| Milk Sanitarian | 160 | 200 |
| Chief of Public Health Education | 275 | 335 |
| Senior Milk Sanitarian.. | 190 | 230 |
| Obstetric Consultant ... | 375 | 450 |
| Pediatric Consultant ... | 375 | 450 |
| Senior Bacteriologist ... | 160 | 200 |
| Assistant Sanitarian (Open to Men and Women) | 125 | 150 |

Assistant Vital Statistician wanted by outstanding private health agency, New York City. Salary \$3,000 per annum. Apply stating education, special training and practical experience. Box N, Employment Service, A.P.H.A.

Wanted: Laboratory technician, tuberculosis hospital, 130-150 beds. Salary \$175 per month and full maintenance.

Opportunity to do research. Nice surroundings, good living quarters. Write Dr. Paul D. Crimm, Boehne Hospital, Evansville, Ind.

THE MERIT SYSTEM COUNCIL OF WEST VIRGINIA
ANNOUNCES UNASSEMBLED EXAMINATIONS
FOR THE FOLLOWING POSITIONS IN THE WEST
VIRGINIA STATE HEALTH DEPARTMENT

| Position | Salary |
|--|-----------------|
| Director of Maternal and Child Hygiene | \$4,200-\$4,800 |
| Assistant Director, Maternal and Child Hygiene.. | 3,840- 4,500 |
| Director, Industrial Hygiene | 4,200- 4,800 |
| Director, Vital Statistics... | 4,200- 4,800 |
| Director, Communicable Diseases | 4,200- 4,800 |
| Assistant Director of Communicable Diseases (Tuberculosis) | 3,840- 4,500 |
| Assistant Director of Communicable Diseases (Venereal Disease) | 3,840- 4,500 |
| Venereal Disease Consultant | 3,840- 4,500 |
| Director, Bureau of Dental Hygiene | 3,840- 4,500 |
| Director of County Health Work | 4,200- 4,800 |
| Senior Health Officer..... | 3,840- 4,500 |
| Junior Health Officer..... | 3,360- 3,840 |
| Health Officer Trainee.... | 2,400 |
| Assistant Director, Hygienic Laboratory | 2,640- 3,240 |
| Senior Bacteriologist | 1,800- 2,400 |
| Senior Serologist | 1,800- 2,400 |
| Consultant Nurse in Special Fields | 2,400- 3,000 |
| Public Health Nursing Supervisor (State level)... | 1,920- 2,400 |
| Public Health Nursing Supervisor (Local level).. | 1,800- 2,040 |
| Chief of Medical Services.. | 4,800- 5,280 |

Persons interested should make application to the Merit System Council, 212 Atlas Building, Charleston, W. Va.

Residence in West Virginia has been waived. Applications will be accepted continuously.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK, 19, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

Physician, age 36, M.D. Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. A-476

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. A-505

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as city or county health officer or director of a bureau. A-506

M.D., Dr.P.H., now a practising physician, chief of a clinic, diplomate in his specialty, professor in a medical school, ineligible for military service but in good health, wishes to make a change in his work and be employed in war industry. A-504

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and bacteriologist and serologist in syphilis and enteric diseases. L-465

Advertisement

Opportunities

PUBLIC HEALTH PHYSICIANS—(a) Director; maternal, child and school hygiene department; pediatric training desirable; public health experience unnecessary; salary commensurate with qualifications. (b) Young woman physician for student health appointment; immediately; East. (c) Field position; state department of health; should be effective public speaker; will provide health training if not trained; Midwest. (d) Staff appointment, department of venereal disease control; special training unnecessary; vicinity Washington, D. C. (e) Director of district health department; training or experience in public health, preferably in administrative side, desirable; \$4,500, plus traveling allowance. (f) Chairman of health division, mid-western college averaging 1,500 students; excellent department splendidly staffed; well equipped infirmary; duties include health education; should be sufficiently trained in psychiatry to be able to help normal young people with problems; must be capable administrator. (g) Assistant director, school of health; public schools; midwestern metropolis. (h) Student health appointment; approximately 1,600 students;

Southwest. PH16-1, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

PUBLIC HEALTH NURSES—(a) Health educator; previous experience in teaching or counseling desired; salary open; Alaska. (b) Public health nurse, to assist in health program for employees of large organization; minimum salary, \$155; with periodic bonuses; Midwest. (c) Public health supervisor for large city health department; must meet requirements of N.O.P.H.N. for educational supervisor; will be in charge of teaching center for induction of new staff nurses, and field supervisor of twenty nurses; \$2,500, with annual increases for merit; large midwestern industrial city. (d) Resident nurse; public health nursing certificate required; will organize health program for school and care for boarding students; outstanding girls' school, large midwestern city; salary open. (e) Instructor in school health education; will be assigned to work in New York metropolitan area; \$1,800, with increase to \$2,000 after probationary period. PH16-2, Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

Situations Wanted

PUBLIC HEALTH ADMINISTRATOR — is available; academic and medical degrees, southern schools; 6 years director department of mental hygiene; 9 years, public health officer; for the past 5 years has successfully filled important administrative appointment. For further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—is available for executive position; B.S. degree Columbia; 3 years, supervising nurse, state department of health; 5 years, field supervisor, large industrial company; 4 years, educational director, public health department, college of nursing. For further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago.

NEWS FROM THE FIELD

SERVICES FOR THE CHILDREN OF WORKING MOTHERS

Further extension of the assistance offered states and localities in the development of services for the children of working mothers has been announced by Charles P. Taft, Director of Community War Services, Federal Security Agency.

Thirty-three state departments of education and 28 state departments of welfare in 38 states, the District of Columbia, and Hawaii have received grants from an allocation from the President's Emergency Fund administered by Mr. Taft's office. The states have been notified that personnel may continue to be paid from this fund through the current fiscal year.

Grants are made by the Federal Security Agency on the basis of state plans approved and recommended by the Children's Bureau of the U. S. Department of Labor or the U. S. Office of Education.

Field representatives of the Office of Education and the Children's Bureau work with state departments of education and welfare in organizing and planning state programs, and make recommendations to the Federal Security Agency's Office of Community War Services for grants to help carry out these plans.

Personnel employed through these grants are engaged in a variety of activities to help set up a wartime child care program. Many of them are coördinators of state or local programs working with Child Care Committees of the Defense Councils to expand, extend, and integrate services of the public and private agencies in the state or locality. Others, specialists in the fields of child welfare, nursery school education, and

extended school programs, have given local welfare and education authorities technical guidance in the development, administration, and supervision of specific types of services for the children of working mothers.

AMERICAN-SOVIET MEDICAL SOCIETY FOUNDED

To meet an increasing demand for information about the results and achievements of Soviet medicine, the formation of the American-Soviet Medical Society is announced.

The society will keep physicians of America and members of the allied professions informed through meetings, the publication of a journal, and the establishment of a library of information. American medical books and periodicals will be sent to the Soviet Union to advise the Russians of scientific developments in this country and to stimulate closer coöperation between the medical corps of the two countries. After the war, as soon as conditions permit, the society hopes to promote the exchange of students and scientists and to sponsor study tours in the two countries.

The president of the society is Dr. Walter B. Cannon, Professor Emeritus of Physiology at Harvard University, member of the National Academy of Sciences of the United States and of the Academy of Sciences of the U.S.S.R.

Dr. Henry E. Sigerist, Director of the Institute of the History of Medicine, Johns Hopkins University, is the editor of the journal which will be known as the "American Review of Soviet Medicine."

The temporary offices of the society are at 130 West 46th Street, New York, N. Y.

FEDERAL EMPLOYEE HEALTH PROGRAM

"The Health Program of the United States Bureau of the Census," by Leon Schwartz, M.D., Medical Officer, is a report on a health program for the employees of the Bureau of the Census working in the new office building at Suitland, Md. Dr. Schwartz is responsible for the organization and conduct of the program which embraces preventive, diagnostic, and therapeutic services. A good deal of progress can be recorded since he took charge on September 1, 1942, and there are ambitious plans ahead. Medical forms and records are reproduced in the report, and an organization chart and a floor plan of the medical unit. Copies of the report may be obtained from Dr. Schwartz.

NORTHERN CALIFORNIA PUBLIC HEALTH ASSOCIATION

The Northern California Public Health Association announces that the following new officers were elected at the recent Annual Meeting of this society:

President—William A. Powell, M.D., Martinez
President-elect—Dwight M. Bissell, M.D., San Jose
Vice-President—Walter S. Mangold, Berkeley
Treasurer—Helen S. Hartley, R.N., Stockton
Secretary—Ann W. Haynes, San Francisco
Representative on A.P.H.A. Governing Council—John D. Fuller, M.D., Santa Cruz
Representative on Regional Board of A.P.H.A. Western Branch—Malcolm H. Merrill, M.D., Berkeley

A CALIFORNIA SCHOOL OF PUBLIC HEALTH

Governor Earl D. Warren of California has signed a bill, previously passed unanimously by the Legislature, authorizing the Board of Regents of the University of California to establish a school of public health for the graduate training of all classes of public health personnel and appropriating modest funds therefor. It is stipulated that the

funds must be used during the current biennium. It is planned to use existing facilities on all campuses of the University of California which may be useful in this training. Last year Dr. Walter H. Brown, formerly Professor of Hygiene at Stanford University, was released to the University of California at Berkeley to assume chairmanship of the Department of Hygiene and to prepare the way for a school of public health.

FLORIDA PUBLIC HEALTH ASSOCIATION

New Officers of the Florida Public Health Association for the current year are as follows:

President—Leland H. Dame, M.D., Sanford
1st Vice-President—J. B. Miller, Jacksonville
2nd Vice-President—W. W. Rogers, M.D., Jacksonville
Secretary-Treasurer—Edward M. L'Engle, M.D., Jacksonville

DR. ELVEHJEM RECEIVES WILLARD GIBBS MEDAL

The Willard Gibbs Medal, ranking honor in American chemistry, has been presented by the Chicago Section of the American Chemical Society to Conrad A. Elvehjem, Ph.D., Professor of Biochemistry at the University of Wisconsin. The award recognized Dr. Elvehjem's work in the study of "trace elements" in nutrition and on tissue respiration as applied to the study of vitamin function.

NURSING IN WAR MANPOWER COMMISSION

Alma C. Haupt, R.N., has been designated Chief of the Nursing Supply and Distribution Unit established in the Placement Bureau of the War Manpower Commission recently. The new unit is designed to effect an equitable distribution of graduate nurses for military, governmental, and essential civilian needs. State and local Councils for War Service will be utilized for the

operation of the unit. Quotas will be set up on national and state bases for the guidance of nurses in accepting service in military, governmental, and essential civilian activities. Katherine Tucker, R.N., Director of the Department of Nursing Education, University of Pennsylvania, has been appointed Chairman of an Advisory Committee to the Nursing Supply and Distribution Unit.

CHRONIC ILLNESS IN NEW YORK CITY

The Welfare Council of New York City offers to readers of the JOURNAL a limited number of copies of *Chronic Illness in New York City*, by Mary C. Jarrett, a study in two volumes made by the Council's Research Bureau. The only charge is for wrapping and mailing, amounting to about 20¢. Requests for copies should be addressed to: Edgar J. Sherman, Director of Finance, Welfare Council of New York City, 44 East 23rd Street, New York, N. Y.

HANDBOOK ON RHEUMATIC FEVER

"Rheumatic Fever in Children—Its Recognition and Management" is a brief clinical handbook written for the practising physician which, perhaps for the first time, makes available under one cover the modern concept of the disease in its various aspects. It describes in concise and authoritative style, the early diagnosis and treatment of rheumatic fever and the methods of managing the disease and recognizing its cardiac involvements. This handbook has been developed by the Metropolitan Life Insurance Company as a part of the insurance company's current educational drive against rheumatic fever. It was prepared in consultation with a group of distinguished clinicians and the following organizations: The American Heart Association, The American Academy of Pediatrics, The Children's Bureau of the

U. S. Department of Labor, The U. S. Public Health Service.

Single copies of the handbook are being made available to physicians chiefly through the Metropolitan's 16,000 field representatives. Physicians who have not secured a copy may write to Dr. George M. Wheatley, Assistant Medical Director, Metropolitan Life Insurance Company, 1 Madison Avenue, New York, N. Y.

PROPOSED BUREAU OF VITAL RECORDS

The principal provisions of Senate Bill 1096—"To Establish a Bureau of Vital Records in the U. S. Public Health Service and for other Purposes"—

The Bill provides:

For the transfer of the vital statistics activities of the Bureau of the Census to the U. S. Public Health Service. The head of the proposed new bureau is to be an assistant surgeon general, and his duties will be to promote improvement of registration of vital statistics procedures in the states, and to coördinate practices with regard to the records of births, deaths, marriages, and divorces. It is proposed that the records and personnel of the Bureau of Vital Statistics be transferred from the Bureau of the Census to the U. S. Public Health Service.

For the purpose of assisting states and their political subdivisions in establishing and maintaining adequate vital services, including training of personnel, it is proposed that there be appropriated the sum not to exceed \$2,000,000 for a year. This sum is to be allocated in much the same way as Title VI Social Security Funds are at present distributed.

MATERNITY CARE

As of May 20, with plans of other states expected to be acted on in a few days, twenty-three state health agencies were authorized to provide maternity care for wives of men in the four lowest

pay grades of the armed forces, and medical hospital and nursing care for their babies, both without cost to the family, according to the Children's Bureau.

States whose programs have been submitted and approved are: Arizona, Arkansas, Connecticut, Delaware, Illinois, Indiana, Kentucky, Maine, Maryland, Michigan, Mississippi, Nevada, New Jersey, New Mexico, North Carolina, Oklahoma, Rhode Island, South Carolina, Utah, Vermont, West Virginia, Wisconsin, and Wyoming.

Under approved states plans, wives of these service men may receive complete medical care during pregnancy, childbirth, and 6 weeks after. At childbirth, whether the wife stays at home or goes to a hospital, she and her baby may have medical and nursing care. Medical care is also provided for the baby throughout his first year of life. All that the wife needs to do to apply is to fill out a simple form which she can get from the state health department.

FIELD TRAINING IN HEALTH EDUCATION AT THE CLEVELAND HEALTH MUSEUM

During the month of August, 27 students in health education from the University of North Carolina will work as Museum interns to receive a course of instruction, do laboratory work, and gain field experience in the methods of health education, especially in health exhibits. Among those students are the 17 individuals who were awarded fellowships by the U. S. Public Health Service, from a grant made available by the W. K. Kellogg Foundation.

The 4 week course at Cleveland Health Museum is part of 3 months' academic training in order to obtain a degree of Master of Science in Public Health. The course will be conducted by Bruno Gebhard, M.D., Director of the Cleveland Health Museum and Associate in Health Education, Western

Reserve University School of Medicine.

Besides instruction in the principles and methods of visual health education the students will gain practical experience in three work units; on ideas, facts, figures, and manuscripts; on designing, constructing, and budgeting of exhibits; and on placement, publicity, visitors' reaction, and follow up.

The Museum's facilities including the workshops, the loan service, traveling exhibits, the film library, and the Museum's own exhibits will be used for this training.

SOME SENATORS DO ANSWER THEIR MAIL!

Among the constituents of all 96 United States Senators, there are many public health workers, we have reason to know, who have been perturbed by the implications of Senate Bill 575. This is the bill introduced by Senator McKellar which would make appointments to all positions in the Executive Branch of the Government carrying a salary of more than \$4,500 a year subject to the approval of the Senate. Its status on May 26, as this is written, is that it is on the calendar.

The Association asked all Senators this question by telegraph on May 11:

What shall I reply to a promising young public health man who believes that passage of Senate Bill 575 will deprive him of all career opportunity in public service as a policy making officer? The American Public Health Association reflects opinion of public health profession that this bill will seriously undermine growing confidence in the Civil Service.

Senators O'Daniel (Texas), Hawkes (New Jersey), and Mead (New York) replied by wire the same day. Each will "give measure consideration." Senator Hawkes added "regards" and the information that he has been studying the bill carefully.

Senator Truman (Missouri) personally acknowledged the wire the day it was received. He "will be glad to

give these views consideration in the event that the bill should come up for vote."

So did Senator McKellar (Tennessee). His twenty word letter said merely that he introduced the bill only after the most careful thought and consideration.

Senator Van Nuys (Indiana) answered via Clerk J. F. Mattice on May 12. He suggested the following reply to the promising young man:

That the bill is not intended to deprive him of all career opportunity in public service and will not operate to do such thing; that the same opportunity will exist as does in the Army and Navy and Coast Guard services, all of whose officers are and for a long time have been confirmed by the Senate after nomination by the President. Young men set about on a Career in the Army or Navy, or in the diplomatic service, and are not deprived of all career opportunity because they are required to be appointed by the President by and with the advice and consent of the Senate. The system as to those career men works very well and no appreciable amount of time of the Senate is taken up in making confirmations. Thirdly, such method of appointment of policy making, army, navy and diplomatic representatives, is the constitutional way—in accordance with the provisions of the Constitution of the United States. The present Bill is aimed at the thousands of persons who have been "blanketed into civil service status" since Pearl Harbor and placed upon positions where they issue orders, regulations, etc., having the effect of law (though not enacted by Congress), which affect the lives and welfare of the citizens of the United States. The public holds Congress responsible for the things of that sort about which they complain, though Congress has nothing to say about their selection.

Senator Pepper (Florida), in a personal acknowledgment dated May 12 was "inclined to oppose" the bill, although he had not made a detailed study of it.

Senator Burton (Ohio) sent an undated, mimeographed reply (received on May 14) which was necessary, it was explained, because of the heavy mail on the bill. He agrees with "the

need for preserving the merit system and the Civil Service." He does not believe it necessary to follow Senator McKellar's proposal. He is "opposed to the bill as it was originally introduced" but it "deserves consideration" in its new form as amended by the Committee. If, however, the new form "still weakens substantially the effectiveness of our merit system, as it apparently does," he will "continue to be opposed to it." Senator Burton added a handwritten note to his thoughtfully prepared form letter—"I believe that your young friend need not worry about his career on merit if he will continue to concentrate on the high degree of public service that is the proper basis of advancement."

Senator Capper began his letter dated May 17 with an apology for his delay in replying and continued:

The bill does not make a special provision for health officers, who would be affected in precisely the same way as all the other better-paid executive employees of the federal government. There seems to be considerable opposition to the McKellar bill, as well as the Hatch and O'Mahoney substitutes, which would require that government officials drawing more than \$4,500 be confirmed by the Senate. Current information is pretty much to the effect that there may not be any action at all at this Session. I am strong for Civil Service and the merit system. Senator McKellar's bill is now on the Senate Calendar with a favorable report from the Senate Judiciary Committee. You may be sure I will go into the subject thoroughly when it comes up in the Senate for consideration and action. I certainly do not want to do anything that will destroy the principles involved in the Civil Service Program.

And that is how the score stands for our side: nine hits, three runs, and eighty-five errors. Perhaps we should make that four hits, and one less error, because one of our spies sends us a letter from Senator Wagner (New York) who believes "the bill, in operation, would seriously impair the merit system." Yes, some Senators do answer their mail!

PRACTICAL ACTION BY STATE AND LOCAL HEALTH DEPARTMENTS TO MEET
THE PERSONNEL SHORTAGE

The A.P.H.A. Committee on Professional Education at its meeting on June 11 reviewed the present personnel shortages with the background of experience of its own members, representing a wide coverage in the nation, and with the help of consultants invited for the purpose of completing the picture.

It is apparent that acute shortages are now general in the supply of public health engineers, of doctors with administrative training and experience, and of public health nurses. Other shortages are rapidly becoming more serious due to the absence of the usual recruits from the universities.

It is also apparent that these shortages have reduced essential services from health agencies of all kinds, even in those areas of acute need where more service is now required than in peace times. There can be no question but that these reductions have already an unfavorable effect on the public health. Members of the committee reported having seen sanitary sewage running in open ditches through heavily populated streets, and it is common knowledge that maternity care in some areas is small in amount and of indifferent quality. It is also common knowledge that attacks of gastroenteritis are becoming common among all travelers who must depend on the overburdened food handling facilities and there is reason to believe that the usual barriers to the spread of such infections are seriously lowered. Supervision of water and sewage treatment plants and of milk pasteurizing facilities has been notably weakened by the withdrawal of those trained and experienced in this work. The hygiene of critical industries is being neglected in some places at a time when the output of factories will determine the outcome of the war.

The attention of the committee was called to the fact that a considerable number of the states have at their disposal more funds than they are using. The real problem lies in finding competent persons who can render basic public health services, upholding standards which have been proved so necessary to the protection of life and health. In some instances it was said that the high qualifications set up in peacetime now stand in the way of bringing onto staffs persons who can render acceptable service, although they cannot meet the standards set previously for career service.

Inasmuch as the Committee on Professional Education of the American Public Health Association has for more than ten years spent its full efforts in lifting levels of professional service in health agencies, it seems appropriate for the committee to face quite realistically the situation which the emergency has brought and to take the measure of the man power shortage as it affects public health.

The committee was reminded that the Association has officially declared at the last meeting that professional qualifications should be upheld for those persons seeking permanent status but that, when the emergency demands that inadequately trained personnel be employed, such persons should be placed on temporary appointment and in special grades below those which the position would normally rate. The Association has further recommended that every effort be made to continue the professional training of all types of persons, utilizing to the fullest extent the funds which are available from all sources. There is no evident lack of funds at the present time, as indicated by the unused balances of federal appropriations which are being re-

turned at the fiscal year end, and the committee reaffirms the necessity of adapting the training program of each agency to the needs of the situation. It is the understanding of the committee that the U. S. Public Health Service and the Children's Bureau have already made provision for a special class of "war service" personnel in acceptable budgets. There is evidence that the schools of public health and other training institutions will be most coöperative. It is a perilous state indeed when those responsible for the health of some of our large population units neglect the opportunity of using available funds for the preparation of any who can help in this emergency.

The availability of women for work ordinarily done by men and of those of older years has been well established. Sanitation services and other basic protections of the public health must not be allowed to suffer at a time like this. The committee recommends that all state health officers take the steps necessary to get under training those whose services are so urgently required. Some of these persons can and should be sent now for formal academic courses of longer or shorter duration, according to the situation in each state. Some persons can and should be employed now, even if their qualifications are incomplete according to standards previously declared. There is good precedent for placing these persons in war service positions where they can contribute most, and then seeing that they have either academic or in-service training to the practical limit available.

The committee is confident that the career standards to which it is already so fully committed may be protected safely for the future only if such urgent steps as these are promptly taken by appointing officers. We believe that the initiative for such steps is a proper responsibility of state and local health officers who are facing present and

prospective staff shortages. In presenting this challenge to the public health profession the committee directs its own staff to lend all possible aid and assistance to accomplish these ends.

SAN FRANCISCO OPENS SOCIAL

HYGIENE WOMEN'S COURT

Dr. J. C. Geiger, Director of Public Health, announced the opening of the San Francisco City Separate Women's Court, located in the Health Center Building, San Francisco. The Separate Women's Court is established to meet the problem of the professional prostitute, streetwalker, and other sexually promiscuous women who are arrested by the Police Department.

Prior to the opening of the Separate Women's Court these women were housed in the women's section of the San Francisco City Prison. During their confinement first offenders were placed with habitues and frequently with other criminals thus affording an excellent opportunity for promoting the maladjustment of the first offender.

The objectives in the Separate Women's Court are to render an entirely individualized case study plan. Every effort is made to provide means for adequate referral of first offenders who present a potentiality of reëducation and readjustment.

The medical coördinator of the Separate Women's Court is the Chief of the Division of Venereal Diseases, Dr. Richard A. Koch. The personnel of the Separate Women's Court consists of a judge, a medical coördinator, a deputy district attorney, a woman physician, a registered nurse, three social workers, four police matrons, one court reporter, one court clerk, a bailiff, and two general clerk stenographers.

WAR MANPOWER COMMISSION CREATES UNIT ON NURSING SUPPLY

Paul V. McNutt, the Chairman of the War Manpower Commission, has an-

nounced the creation of a division on nursing supply and distribution similar to the Procurement and Assignment Service for medical and engineering personnel. Alma Haupt, R.N., of Washington, has been appointed chief of the unit, with Miss Louise Baker of San Francisco as associate chief. Katherine Tucker, R.N., of Philadelphia has been appointed Chairman of the Unit's Advisory Committee. Liaison members of the Unit include the National Nursing Council for War Services, American Red Cross, the Army, Navy, Veterans Administration, and Public Health Service, the Children's Bureau, the Office of Indian Affairs, the Office of Civilian Defense and the Civil Service Commission.

"YOUR HEALTH" RADIO PROGRAM

Carl A. Wilsbach, M.D., Commissioner of Health of Cincinnati, began a new series of weekly radio broadcasts over Station WLW on June 19. The program is entitled "Your Health," is broadcast at 9:45 A.M., E.W.T., on Saturdays, and is sponsored by the Academy of Medicine, the Public Health Federation and the Cincinnati Board of Health. It utilizes Dr. Wilsbach as narrator, interspersed with dramatic sequences.

Central States

CLYDE D. BLAKE, M.D., of Hays, Kans., Past President of the Kansas Medical Society, has been appointed a member of the Kansas State Board of Health.

GILBERT G. COTTAM, M.D., of Sioux Falls, S. D., has been appointed Superintendent of the South Dakota State Board of Health, to succeed the late J. F. D. Cook, M.D. W. R. GIEDT, M.D., Assistant State Health Officer and until Dr. Cottam's ap-

pointment, Acting Superintendent of the Board of Health, has resigned to accept a position as Epidemiologist for the State Health Department of Washington.

I. R. VAUGHN will head the Division of Public Health Education, which has recently been established by the South Dakota Health Department. Mr. Vaughn is also Assistant Director of the Division of Vital Statistics.

Eastern States

VLADO A. GETTING, M.D.,* since 1942 Commissioner of Health of Worcester, Mass., has been appointed Commissioner of Public Health of Massachusetts to succeed PAUL J. JAKMAUHI, M.D.,† of Boston.

ROGER E. HEERING, Passed Assistant Surgeon, U. S. Public Health Service, has been lent to the State of Ohio for service as Venereal Disease Control Officer. Dr. Heering came from District No. 1, U.S.P.H.S., with headquarters in New York, where he had been Venereal Disease Consultant for 10 states included in the district. Dr. Heering had been lent to Ohio during the period 1939-1940 as Venereal Disease Control Officer in the Cincinnati area.

JOSEPH LACHMAN, M.D., formerly of Chester, Pa., U. S. Public Health Service, was recently appointed in charge of the Pulaski and McCreary County Health Departments.

PROFESSOR SAMUEL CATE PRESCOTT,* of Brookline, Mass., Emeritus Dean, School of Science, Massachusetts Institute of Technology, Cambridge, Mass., has been awarded the Nicholas Appert Medal of the Chicago Section, Institute of Food Technologists. Eligibility for the award, established in 1941, is based on preëminence in the field of food technology and on contributions to the progressive development of food manufacture and processing.

* Fellow A.P.H.A.

† Member A.P.H.A.

WILLIAM A. SAWYER, M.D.,* since 1919 Medical Director of Eastman Kodak Company, Rochester, N. Y., has received the 1943 W. S. Knudsen Award of the American Association of Industrial Physicians and Surgeons, for "outstanding work in control of tuberculosis, constructive contributions to a practical program of nutrition in industry, and setting up a program of rehabilitation for handicapped workers in industry."

CHARLES F. WILINSKY, M.D.,* Executive Director and Superintendent of the Beth Israel Hospital, Boston, Mass., on April 12 was awarded the annual medal of the Boston City Club for distinguished civic service. Dr. Wilinsky is Chief Medical Officer of the Boston Public Safety Committee and his selection for the medal was "the outcome of his work in organizing the medical section of the city's civilian defense effort, and for his work during the Coconut Grove disaster." The gold medal is presented each year to the civilian adjudged by the club to have rendered the most outstanding civic service to Greater Boston.

SAVEL ZIMAND,* an administrative assistant in the New York City Health Department for 9 years, has been appointed Acting Director of the Bureau of Health Education. He succeeds CHARLES F. BOLDUAN, M.D.,* first director of the Bureau, who has reached the retirement age.

Southern States

ANTHONY J. BOROWSKI, DR.P.H.,† until recently Chief of the Health Section of the Federal Works Agency, Works Progress Administration, Washington, D. C., has been appointed Chief Clerk and Statistician of the Division of Records and Statistics of the Richmond Department of Public Health.

JOHN S. CHAMBLEE, M.D.,† of Wind-

sor, N. C., Health Officer of Bertie and Chowan Counties, has been appointed Health Officer in Nash County, succeeding THOMAS O. COPPEDGE, M.D.,† of Nashville, resigned.

LELAND H. DAME, M.D.,† Director of the Seminole County Health Unit, Sanford, Fla., was elected President of the Florida Public Health Association at the recent annual meeting in Jacksonville.

DR. W. HARRY FEINSTONE,† formerly associated with Johns Hopkins University, Baltimore, Md., has been appointed as Director of Biological Research by the Pyridium Corporation Yonkers, N. Y.

DOUGLAS H. FRYER, M.D., D.P.H.,† Director of the Rockingham County Department of Health, Spray, N. C., has accepted an appointment as director of the combined county and city health departments at Bay City, Mich.

MAJOR HAROLD B. GOTAAS,† Chief Engineer, Division of Health and Sanitation, Coördinator of Inter-American Affairs, has returned from South America, where he was working on the health and sanitation projects in the different countries.

CHESTER A. HICKS, M.D., DR.P.H.,† Surgeon Reserve, U. S. Public Health Service, was appointed Director of Public Health of the City of New Rochelle, N. Y., on May 1, 1943. Up to this time Dr. Hicks served as Director of Health of the Carter Unicoi-Johnson Health District, Elizabethtown, Tenn.

CHARLES N. LEACH, M.D., C.P.H.,* of Montgomery, Ala., was in Manila, Philippine Islands, at the time of the Japanese invasion and has been interned as a prisoner of war since that time.

* Fellow A.P.H.A.

† Member A.P.H.A.

THEODORE R. SIROP, M.D.,† assumes his duties as Health Officer of Garrett County, Maryland, as of July 1, holding at the same time the appointment of Deputy State Health Officer in that county, which is also known as the First Sanitary District under the Maryland State Department of Health.

BRIGADIER GENERAL JAMES STEVENS SIMMONS,† A.U.S., Director of the Preventive Medicine Division of the Office of The Surgeon General, U. S. Army, Washington, D. C., has been appointed Lecturer in Public Health on the Staff of the School of Medicine at Yale University, New Haven, Conn.

Western States

DONALD J. BOURG, M.D.,† of The Dalles, Ore., recently Health Officer of Wasco and Sherman Counties, has been named Health Officer in Benton and Polk Counties, with offices in Corvallis.

CLAUDE C. CHICK, M.D., has been named Health Officer of Hood River, Ore.

EDWARD E. DART, M.D.,† formerly Director of Industrial Hygiene in the Department of Health of the City of Los Angeles, Calif., has resigned to accept a position with the Chrysler Corporation in Chicago, Ill. YALE ROSENFELD, Assistant Sanitary Engineer, U. S. Public Health Service (R), has been appointed Acting Director of the Division of Industrial Hygiene in Los Angeles.

WILLIAM E. STEELE, M.D., of Olympia, Wash., has resigned as Chief Medical Adviser to the State Department of Labor and Industries, to engage in private practice in Seattle. Dr. Steele, who held the State position for 7 years, will be named Con-

sultant to the Department in the Seattle area.

HAROLD B. STOUT, M.D., of Brewster, Wash., has been named Health Officer of Pateros.

RAGNAR T. WESTMAN, M.D., DR.P.H.,* Surgeon (R) in the U. S. Public Health Service, on April 29 was appointed Acting Commissioner of Health of Seattle, Wash., succeeding FRANK M. CARROLL, M.D.,† retired.

Canada

AIME COUSINEAU, C.E.,* City Sanitary Engineer, Health Department, Montreal, Canada, is now Director of the City Planning Division. He retains his post as City Sanitary Engineer of the Health Department.

ANTOINE B. VALOIS, M.D., M.P.H.,† has been appointed demographer and Superintendent of the Vital Statistics Division of the Montreal Health Department, P. Q., Canada. He is a graduate of the University of Montreal and Johns Hopkins School of Hygiene and Public Health. He succeeds EUGENE GAGNON, M.D., deceased.

Mexico

DR. VICTOR FERNANDEZ MANERO,† Chief of the Federal Department of Health in Mexico, Mexico City, was recently presented with the diploma and the gold medal of a fellow honoris causa of the International College of Surgeons as a token of national appreciation for his work on public health in Mexico.

Deaths

WARREN F. DRAPER, JR., M.D.,* of Paris, Tex., Health Officer of the Paris-Lamar Health Unit, died in May.

PROFESSOR MARTIN H. KNUTSEN,† a member of the Association since 1919, died on February 6 after a

* Fellow A.P.H.A.

† Member A.P.H.A.

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The National Board of Health* 1879-1883

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VERY few people in the United States, even among that group most actively engaged in national public health affairs, realize that the United States once had a National Board of Health.

It is a dramatic story, and, like all dramas, has its heroes, struggling against overwhelming odds; its villain, who possesses the intelligence and aptitudes that all villains are supposed to exhibit; its comedy; its periods of calm which usually preceded another stormy outburst; its climax, anti-climax, and finale.

The idea of unified, correlated national health services had been germinating slowly since the epidemic of yellow fever in 1793. Three National Sanitary Conventions had been held from 1857 to 1860, and the question of a nation-wide quarantine service was discussed at these meetings. At the first meeting of the American Public Health Association in 1872, Dr. C. C.

Cox, Health Officer of Washington, D. C., gave an excellent discourse on the necessity for a national health organization and outlined its functions and a suitable organization. State Boards of Health were being organized in rapid succession. In 1874 the National Association of State Health Commissioners was formed, and the obvious need for a central federal health agency became more and more apparent.

A meeting attended by representatives of many state and city health departments was held in Washington in 1875 to discuss plans for a federal health organization, but this convention met with little success. The three existing national government departments that already possessed medical officers—namely, the Army, the Navy, and the Marine Hospital Service—flew into a jealous dispute as to which should be most prominent in the new organization; and the meeting closed in dissension. Dorman B. Eaton, the distinguished lawyer who had drafted the pioneer Metropolitan Board of Health

* This article is a chapter of a book in preparation upon *The History of Public Health in the United States*.

Act of New York in 1867, and also had drawn the act for the New York State Board of Health, was asked to prepare a draft of a bill which would create a National Board of Health. He did so, placing the medical departments of the Army, Navy, and Marine Hospital Service on the same footing. This proved fatal. Both the Army and the Marine Hospital Service rejected the bill and each at once endeavored to secure legislation from Congress which would make its service more prominent in national sanitary work.

The yellow fever epidemic of 1878 precipitated the issue. This devastating outbreak swept up the Mississippi Valley from New Orleans, causing great loss of life and paralyzing industry. The Valley states realized that the invasion came to them from the river, and blamed the Louisiana authorities for lax sanitary administration. They felt that their only hope against future disaster lay in a coördinated health service under national auspices.

In April, 1878, Dr. J. M. Woodworth of the Marine Hospital Service succeeded in getting a bill through Congress which conferred quarantining powers on his department, but he was given no appropriation to carry out the objects of his bill.

When Congress convened in 1879, the sentiment of the public was unmistakable. There must be no repetition of the disaster of 1878. The Army and the Marine Hospital Service both sponsored bills relating to a National Health Department. Dr. Stephen Smith thought that Dr. Woodworth's bill was the only one that could pass, and thus he sponsored it. But the act that Congress finally accepted in March, 1879, was sponsored by the American Public Health Association and drawn by Mr. Eaton. It transferred from the Marine Hospital Service all the health duties and powers hitherto conferred upon it, including all maritime quaran-

tine. Surgeon General Woodworth, a fine, sincere, talented man, had worked very hard for his bill and sincerely believed it was the best that had been proposed on national health legislation. Upon its failure, he collapsed, and within a few days he was dead.

The new act created a National Board of Health, consisting of seven physicians, no two from any one state, and a representative from the Army, the Navy, the Marine Hospital Service, and the Department of Justice. The members were appointed by the President and had the following duties:

1. To obtain information on all matters affecting the public health.
2. To advise governmental departments, the commissioners of the District of Columbia, and the executives of the several states on all questions submitted by them—or whenever in the opinion of the Board such advice may tend to the preservation and improvement of the public health.
3. Report to Congress a plan for a national health organization, special attention being given to quarantine and especially regulations to be established between the states, as well as a national quarantine system.

The following men were appointed to membership on the Board, and \$50,000 was appropriated for this work:

J. L. Cabell, J. S. Billings, T. J. Turner, P. H. Bailhache, S. M. Bemiss, H. I. Bowditch, R. W. Mitchell, Stephen Smith, S. F. Phillips, and T. S. Verdi.

The Board was an excellent one. Dr. Cabell, professor at the University of Virginia, was one of the most distinguished physicians of his day; Stephen Smith had done more to advance the public health than any man in the nation. Henry I. Bowditch, the Boston representative, was the pioneer in state health work in New England; J. S. Billings was to become the foremost physician of the land.

On June 2, 1879, Congress passed a second act, giving the new Board wide quarantine powers, and appropriated

\$500,000 for its quarantine work. This act had one clause which proved to be a fatal weakness: It gave these quarantine powers for a period of four years only, and a reenactment bill was necessary for a continuation of the work.

The National Board started its work most auspiciously. Eight quarantine inspectors were employed, covering the coast from Maine to the Rio Grande. Familiar names appear: Elisha Harris was assigned the coast from Portland to New York; A. N. Bell was given Norfolk to Brunswick, Ga., and Jerome Cochran, from Key West to Pensacola. In theory, the National Board aided states in enforcing their quarantine regulations, but in practice, since the National Board had the funds, it dictated the quarantine policies. From January 12 to June 30, 1880; the Board spent \$284,000, and during the next fiscal year, \$202,000 was expended for hospital construction and quarantine purposes. It sent a yellow fever commission to study conditions in Cuba, with Dr. Chaille of New Orleans as Chairman and Dr. Sternberg as Secretary. The Board members themselves were very active on a variety of sanitary matters and published some excellent reports.

But serious trouble was not far off. Dr. Joseph Jones was secretary of the Louisiana Board of Health. He was a man of tremendous energy and strong opinions. He had been an officer in the Confederate Army, and was an indomitable foe to anyone who did not agree with his ideas. Although he had lost the Civil War, he had not lost his belief in States' Rights. He wrote Dr. Cabell in the summer of 1880:

"The Board of Health of the State of Louisiana cannot delegate its quarantine powers to any other organization, whether created by a National Congress or by other individual States."*

* National Board of Health, "Reports" 1880, page 605.

Shortly thereafter an epidemic broke out in the delta below New Orleans. Sternberg visited the zone and made the diagnosis of yellow fever. Samuel Bemiss, the member of the National Board who lived in New Orleans, wrote Dr. Jones the facts in a rather superior manner, stating that the National Board could be drawn upon for necessary funds for disinfectants, sanitary inspections, and for necessary equipment in order to control the epidemic. He stated just how funds were to be allotted and indicated that approval of all expenditures must, of course, be in his hands. This statement has a familiar sound to present-day health departments that receive federal grants-in-aid, but most modern state health officers are not so conscious of the principle of state sovereignty as was Dr. Jones. Dr. Jones responded that the Louisiana Board of Health had investigated the "*malaria fever*" of the rice lands and that necessary health measures had been taken, thus putting young Sternberg in his place. Sternberg made a second visit and again made a diagnosis of yellow fever. A neutral commission was then selected to study the matter. Dr. Mitchell, the Board member from Memphis, and Sternberg went along. The commission decided that the epidemic was malaria,* and Dr. Jones won the first round.

On July 15, 1880, a vessel called the "Excelsior" came to New Orleans with a cargo of coffee. Five days later one of her crew developed yellow fever. She had been held in quarantine a few days in the lower delta, and it is possible that her crew was infected from the cases diagnosed as yellow fever by Sternberg. Meanwhile, the coffee had been sent to a number of interior cities.

* From the description of the cases, Sternberg may have been wrong. It is more probable that there were cases of both yellow fever and malaria at the same time. Diagnosis was purely symptomatic and very difficult.

Dr. Bemiss, National Board member in New Orleans, telegraphed the facts to the health officials of these various cities. This was an unprecedented thing to do and was an interference with commerce. Dr. Bemiss writes:

"A great deal of excited discussion arose in consequence of this action of the National Board in relation to the cargo of the 'Excelsior.'"

The upper Mississippi Valley states had no confidence in the Louisiana quarantine service and stood by the National Board in this controversy. But apparently Dr. Jones was more than a match for Bemiss. He stung like a hornet, for he was never satisfied with one encounter, but always returned to the attack.

In 1881, the National Board appointed as its inspector a worthy opponent for Dr. Jones in Dr. S. E. Chaille. He had been a famous Confederate War officer, was a professor in the Medical College, and perhaps the most beloved physician of Louisiana. His appointment appealed to local sentiment and was a very wise move on the part of the National Board of Health. But trouble began for Dr. Chaille almost at once. To forestall any outbreak and to be prepared for emergencies, before the yellow fever season began he asked the Louisiana Board of Health for the right to station his inspector down the river at the state quarantine, and also asked to have access to the New Orleans death reports. The Louisiana Board of Health were indignant, and felt that they had been grossly insulted. They would have no federal "spies" in their midst. But the New Orleans Auxiliary Sanitary Association—a group of business men—supported Dr. Chaille. One suspects they did so because of the threat of embargo from the Sanitary Council of the Mississippi Valley, which had insisted upon federal supervision of the

Louisiana quarantine officers. Dr. Cabell wrote from Washington directly to the Governor of Louisiana requesting his coöperation. The Governor supported the National Board of Health, and Dr. Jones lost the second round.

His own letters testify that he did everything in his power to make life miserable for Dr. Patton, the federal inspector who was stationed at quarantine.*

The year 1882 was the most active and productive of the National Board of Health. The report of the year is a book nearly six inches thick devoted to various sanitary investigations that were carried out by members of the Board, or that were authorized by the Board. Many of these studies are basic, well planned, and efficiently executed. But the gadfly at New Orleans was more tormenting than ever before. All states, says the report rather plaintively, are willing to coöperate with the National Board except Louisiana.

On May 1, before the yellow fever season began, Dr. Chaille wrote the new Governor of Louisiana asking if the National Board inspector could again be stationed at state quarantine. The Governor replied in the affirmative, stating:

"The inspector is expected, in accordance with the original authorization of Congress, to aid and assist our state quarantine officer. It must be understood that he shall not supervise, control or direct the actions of the state quarantine officer."

Dr. Patton was again assigned to quarantine by Dr. Chaille, but Dr. Jones kept up a continual battle against what he considered the effrontery of the federal government in invading his state and attempting to supervise his work.

* See Dr. Chaille's defense of Dr. Patton in letter to Dr. Jones, Sept. 5, 1881, p. 339 of *Reports of National Board of Health*. See also Vol. III, compiled works of Dr. Jones.

Dr. Chaille wrote at the end of the summer:

"I shall hope never again to occupy such unpleasant and detrimental circumstances as my office has brought me during the past two years."

When Congress was considering the appropriation for the National Board that summer, the New Orleans press accused the Board of "manufacturing yellow fever in the Mississippi Valley" to frighten the national legislative body to give it more funds and continue its work. A telegram from the National Board Secretary, Dr. Turner, was misquoted by one of the New Orleans papers to say that if the National Board was not supported, it would be necessary for the upper Valley states to resort to the "trusty shotgun" for the purpose of enforcing quarantine against yellow fever. The Louisiana State Board of Health flew into a rage and passed the following resolution:

WHEREAS: the National Board of Health by the emission of such innuendos and incendiary publications violates the conventionalities of official intercourse in a gross and unwarrantable manner, showing what it would do if it once had the power, and reflecting most aristocratically upon the self governing power of the American people — —

BE IT RESOLVED, that the telegram of Secretary Turner be copied and forwarded to President Cabell, with the request that in the future their communications be couched in more decorous language when alluding to this Board.

Few of the friends of the National Board seem to have realized that while the controversy in New Orleans was raging, a much more dangerous foe within the shadow of the National Capital was quietly plotting its destruction. When Surgeon General Woodworth died, a young Marine Hospital Service officer, John Hamilton, was appointed to the position. His rise in the Service had been phenomenal. He had taken no part in the advance-

ment of public health in the nation and was not even a member of the American Public Health Association. He had no knowledge or experience in the field of quarantine, nor, in fact, had he any knowledge or experience in the fields of sanitation and public health. He was forceful and intelligent, and must have been an expert in political intrigue. He knew that if Congress did not reenact the quarantine law by June 2, 1883, the National Board of Health must terminate. Since the bill of April, 1878, had granted quarantine powers to the Marine Hospital Service, these functions would revert to him and to the Marine Hospital Service if the National Board of Health was discontinued.

Quietly and effectively he did his utmost to bring discredit upon the National Board of Health and its activities. He accused the members of the Board of misuse of funds, of extravagance, and incompetence. He insinuated that leading sanitarians, such as Rauch, Kedzie, Elisha Harris, and Wirt had used funds of the Board to corrupt local health officers, and claimed that they had packed the Indianapolis meeting of the American Medical Association in securing endorsement of the National Board.

Congress gave consideration to extension of the activities of the National Board of Health in 1884. Colonel George Waring, Secretary of the Board in 1884, in his remarks before the Committee of Public Health of the House of Representatives, stated:

"In Dr. Hamilton I knew was centered the only effective opposition to the National Board of Health. I accused him of misrepresentation to lash him into appearance before this Committee rather than, as has been his practice hitherto, 'at the button hole.'"

Waring pointed out that Hamilton's quarantine work (in the Brownsville epidemic) "has been injudicious and unskilled," and insisted that the Marine

Hospital Service had no facilities at all except curative ones, and was engaged in one specific duty: the cure of sick sailors.

The defenders of the National Board of Health were good sanitarians but poor politicians. It was true that the members of the Board had been overzealous; they had tried to move too rapidly, and in this sense they had been extravagant. They had made the fatal mistake of encroaching on the prerogatives of the individual states, and the representatives of these states in the Congress did not relish this taste of federal centralization of power. There had been no more widespread epidemics, and memory of past disaster is notoriously short. The real statesman profits by past experience and plans for the long future, but not the politician.

Despite the support of the American Public Health Association, the Sanitary Association of the Mississippi Valley, the State Departments of Health of Massachusetts, New York, Illinois, Michigan, and many others, the re-enactment bill of June 2, 1883, failed to pass. A small grant of \$10,000 was given the National Board to continue its investigations and advisory functions, but all its quarantine powers reverted to the Marine Hospital Service.

Stephen Smith, of all the national sanitarians, saw the importance of a *National Public Health Service*. He had favored Woodworth's bill in 1879. He was cited by Hamilton in 1883 as favoring transfer of the National Board's powers to the Marine Hospital service; but Smith, in his address before the Public Health Committee of the House of Representatives in 1883, makes his stand clear. He wished to confer all public health duties and powers on the National Board of Health, but to incorporate in the National Board the officers, the staff, and the activities of the Marine Hospital Service. He foresaw that Con-

gress would lose interest in the National Board of Health, but would continue to support a service agency that had full-time career officers and was incorporated as an integral part of national government machinery.

In retrospect we realize that Stephen Smith was right. The unwieldy board of experts, each living in a different community and attempting to carry out administrative duties, with no cohesion, no real unity of opinion and no central authority, was an impossible administrative machine. A centrally guided service, such as actually developed, had unity and purpose, but unfortunately lacked intelligent leadership. The public health policies for a great nation for many years were determined solely by the opinions—sometimes the whims and personal prejudices—of a single individual. It would have been a much better plan if Dr. Stephen Smith's half formulated plan of 1883 could have been carried out, thus salvaging the really important features of the National Board of Health and incorporating in it a service agency with full-time personnel, an *esprit de corps*, and a strong central administrative machine. The members of the Board of Health, selected by the President of the United States because they were public health experts, should have been continued as a Board of Health and should have served as a permanent policy-forming body, advising and aiding their administrative officer. The Marine Hospital Service was the most logical existing national agency with which to vest this national public health function. The Surgeon General should have been made the executive officer of the Board, and all actual administrative responsibility should have been centered in him. It was a great opportunity to have organized a close-knit, effective National Health Service, but there was no single man who had the vision or the power to solve this simple problem.

The Preventive Medicine Program of the United States Army*

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THE Medical Department of the Army is responsible for the health of all our military personnel. Its principal mission is to keep the soldier fit to fight. A complex organization is required to accomplish this mission, and at present the Medical Department includes the following important branches: The Medical Corps, Dental Corps, Veterinary Corps, Nurse Corps, Sanitary Corps, Medical Administrative Corps, the Physical Therapy Aides, and the Dietitians.

Obviously the services rendered by the Medical Department are manifold. This organization is intimately concerned with the health and welfare of the soldier from the moment of his induction until he leaves the service. It establishes and maintains the physical standards used in the selection of all Army personnel, and it examines every soldier inducted. It is concerned with seeing that he is provided with satisfactory shelter, that he is fed an adequate, well balanced diet, and that he takes the proper physical exercise. It is concerned with his habits and hygiene, with the sanitation of his environment, his immunization, and with the innumerable other measures required to protect him against disease. If he becomes ill or injured the soldier

receives excellent medical attention in a modern army hospital, and when he eventually leaves the service he is given a final physical examination by the Medical Department.

The most glamorous of these activities in time of war is the medical and surgical care of the sick and wounded. The life of a medical officer assigned to duty in an active theater of operations is packed with drama intense enough to satisfy the most romantic cravings for adventure. The devotion to duty of the officers of the Medical Department has always been a credit to our profession. Their heroic achievement—in the evacuation and care of the wounded, in salvaging the human wreckage of battle, in snatching the gravely injured from the brink of death, and in returning the wounded to active duty—constitutes a thrilling epic of war. It affords a satisfying contrast to the necessary but unpleasant task of destruction that is basic to all war.

There is, however, another aspect of military medicine that is less dramatic but equally important. It is to this, the preventive aspect, that attention is invited. To keep at all times the maximum number of men in condition to perform their military duties requires that these men be protected from the numerous hazards with which they are surrounded, hazards which if not controlled may so seriously deplete man

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power as to render military operations ineffective or impossible. Lord Disraeli, that shrewd and farsighted statesman of the Victorian era, has been quoted as stating that "the prime function of government is the protection of the health of its people." A civil population that is not healthy cannot be prosperous and will lag behind in the economic competition between nations. This is even more true of a military population, for any army that has its strength sapped by disease is in no condition to withstand the attack of a virile force that has conserved its strength and is enjoying the vigor and exhilaration of health.

History is replete with dramatic examples of the influence of disease in shaping the course of battles and campaigns. From the days of ancient Greece and Rome to the present time epidemics have played a vital rôle in determining the outcome of military operations. The world has never seen, and probably will never see, the military genius who can ignore this important factor. Alexander felt the withering blight of disease. Hannibal was cheated of his conquests by illness in his Army. More than one of the crusades of the Middle Ages were turned back by the ravages of infection rather than the arrows of the Saracens. Napoleon, in his retreat from Moscow, felt the sting of disease and the crippling effects of physical deterioration. The last world war was prolonged in several theaters by the paralyzing action of disease. In Macedonia, malaria immobilized large British, French, and German forces for about three years. Eighty per cent of 120,000 French troops were hospitalized; and among the British with a strength of 124,000 there were 162,000 admissions for malaria between 1916 and 1918.

We may admire the technological advances that have produced the powerful weapons of today, but there is one

factor which has not changed since the day of the crossbow and the sword. That factor is the need for man power with which to operate these modern instruments of destruction. Therefore, this World War presents no exception to the generalization that the protection of the health of troops is an essential part of any well planned military operation. The nature and extent of our current operations are such that never before has it been so necessary to guard our soldiers against disease. The destructive power of modern weapons and the mobility of troops is now so great that a military force, disabled by disease, is relatively more defenseless than ever before, when confronted by a healthy opponent. Moreover, the wide geographic distribution of our present operations has introduced many new health hazards. American soldiers are scattered around the globe. Literally they are spread from Greenland's icy mountains to India's coral strand.

Today we are faced with the danger of operating in tropical areas that present some of the most difficult health problems that ever confronted a military force. Even under conditions of peace, life in the tropics has usually been attended by greater health hazards than life in the temperate zones. The backward civilizations encountered in many of these hot climates testify to the debilitating effects of the local diseases. Poor sanitation is the rule—poor sanitation that exerts an obviously bad effect on the native populations and is even more dangerous to the incautious visitor. In such places the enteric and the insect-borne diseases are usually prevalent. Often they are so common that it is exceptional to find an uninfected native. Diseases that are medical curiosities in this country are matters of everyday occurrence. Even the tropical climate itself, with its high heat and humidity, constitutes a menace—one that the native has learned to

reduce by living a leisurely and ordered life, such as is not possible under military conditions.

We must remember, however, that the disease hazards of this war are by no means limited to the tropics. The present conflict is truly global and the military action extends from the equator to the Arctic circle. Wherever American troops are stationed they are exposed to dangers of infection incident to their physical and social environment. These are encountered first at home during the period of training and they are accentuated later in the overseas theaters. Military preventive medicine has as its main task the control of these hazards in order that man power may not be wasted through avoidable illness or death.

Obviously, this huge task of health protection is a responsibility shared by all Medical Department officers wherever they may be stationed. The medical officers assigned to duty with troops in the field constitute our first line of defense against disease. To this field personnel will always fall the task of putting into action such measures as are found to be most effective. The planning and the correlation of these activities are the function of the Preventive Medicine Division of The Surgeon General's Office. It is to this phase of the preventive program that this discussion relates.

THE PREVENTIVE MEDICINE DIVISION

During 1939, when the clouds of war began to gather, it became obvious that this country might ultimately become embroiled in a world conflict. The Surgeon General of the Army devoted increasing attention to plans for protecting the health of our troops under conditions of mobilization and war. From a small and rather informal beginning there evolved in his office during 1941 a special Preventive Medicine Division. This division has developed

into an organization which today covers a wide variety of fields all concerned with disease prevention.

The objectives of the division have been the maintenance and conservation of the health of the Army through the prevention and control of infectious diseases and the elimination of sanitary, occupational, and other health hazards. It has advanced toward this objective by the development of plans based on estimates of future possibilities, by the constant accumulation of scientific knowledge from all available sources, and by the vigorous application of the most promising control procedures. In this work the division has utilized every available facility and has enlisted the services of many highly qualified persons. In general the nature of the work is the administrative management of all phases of preventive medicine. This division is concerned with the following activities: the establishment of policies and procedures; the development of control measures; the procurement and assignment of specialized personnel; the collection, analysis and distribution of information on medical and sanitary conditions in all parts of the world; and the initiation of research on problems of immediate significance to the Armed Forces. It has maintained close liaison with numerous governmental and civilian agencies. These include the National Research Council, the Committee on Medical Research of the Office of Scientific Research and Development, the Bureau of Medicine and Surgery of the Navy, the U. S. Public Health Service, the Pan American Sanitary Bureau, the Office of Coördinator of Inter-American Affairs, the International Health Division of The Rockefeller Foundation, and most of the scientific societies in the fields of biology, medicine, and public health. Association with all of these agencies has been extensive and intimate.

The Preventive Medicine Division now includes the following branches: Sanitation, Sanitary Engineering, Epidemiology, Laboratories, Military Occupational Hygiene, Venereal Disease Control, and Medical Intelligence.

The Sanitation Branch—The Sanitation Branch is of great importance. Sanitation has long been recognized as the backbone of preventive medicine. In civil life it is accepted as a commonplace and inevitable attribute of civilization. Thus we often fail to appreciate how much our physical well-being depends on the routine performance of the homely functions of sanitation. Its adaptation to the conditions of military life, especially to operations in the field, involves highly specialized technics, although the underlying principles remain the same. Neglect of sanitation almost inevitably results in outbreaks of preventable diseases. Obviously, therefore, it is essential to maximum military effectiveness.

The foundation of sanitation is cleanliness. It is logical therefore that, in the Sanitation Branch, much attention has been devoted to the study, development, and promotion of measures which will provide for the soldier a clean healthful environment. The officers of this branch maintain close contact with conditions in the field through the careful analysis of the routine and special sanitary reports which are received from all military organizations at least once each month. This affords an excellent opportunity to assist the medical officers of the various organizations in the solution of their sanitary problems. The branch is also concerned with the formulation of general policies on sanitation and hygiene. Liaison is maintained with the Quartermaster, the Engineers, and various other branches concerned with food and water supplies, sewage and other waste disposal, housing, ventilation, clothing, and insect control; also with numerous other

agencies engaged in the development of more effective sanitary methods.

The best of food can easily become a vehicle for disease if it is contaminated through improper handling. The sanitation of food handling is therefore a matter of great concern to this branch. Those of you who are familiar with the difficulties of food sanitation in the permanent installations of civil life will appreciate the infinitely greater obstacles to be overcome in dealing with this complex problem under field conditions in the Army, especially in the combat zone. However, these obstacles must be overcome, for in any military force the slightest relaxation of sanitary discipline may produce enteric infections severe enough to immobilize the entire force.

The sanitation of water, which is intimately related to food sanitation, is also a major responsibility of this branch. All recognize the important rôle of water as a vector of enteric diseases; but few, who have not seen the conditions under which many of our troops are living abroad, can appreciate the degree to which the water supplies of those areas may be polluted with human excrement. The Sanitation Branch is concerned with the purification of such water under the most trying field conditions. Obviously this requires technics entirely different from those employed in civil life or in fixed military installations. These technics must be so simple that they can be performed by the average soldier; the equipment must be easily portable so that it can be carried under conditions of combat; and the procedures must be so effective as to decontaminate, and render safe, water from sources that would be rejected under the normal conditions of civil life. This branch is also concerned with the development of policies and methods which will insure the sanitary disposal of sewage and other wastes.

Closely allied with the sanitation of water, food, and wastes, are the problems connected with the control of the horde of insects that are present in many areas. As a rule flies are only a nuisance in our modern cities. On the other hand, they may constitute a serious menace to health in areas where sanitation is primitive or neglected.

Many of the biting insects carry serious diseases and therefore their eradication or control is of the greatest importance. For this reason the Sanitation Branch is concerned with the development of measures that will protect troops against mites, ticks, lice, bedbugs, fleas, mosquitoes, sandflies, and various other kinds of gnats and biting flies. Another important function is the control of the rodent reservoirs of disease. The measures used are quite varied, depending on whether the troops are living in permanent camps or in the field. In the vicinity of fixed installations they include extensive insect and rodent control projects. Under field conditions reliance must be placed on the personal protection of troops through the use of our highly effective new repellents and insecticides.

Sanitary activities on Army posts in the continental United States are supplemented by work done outside this area by civilian health agencies. Early in 1940 The Surgeon General of the Army made arrangements whereby the U. S. Public Health Service, working through state and local agencies, has provided for extra-military sanitation in civilian areas around all Army reservations. This activity has been coordinated through the assignment of U. S. Public Health Service officers to the headquarters of each Service Command for cooperation with the Army Surgeon.

*The Sanitary Engineering Branch—*The Sanitary Engineering Branch deals with the engineering aspects of sanita-

tion. The officers assigned to this branch are concerned with the sanitary control of the large water purification plants and sewage disposal plants of permanent camps, posts, and stations. The Corps of Engineers is responsible for the actual construction and operation of these facilities, but the sanitary engineer is concerned with such supervision and advice as may be necessary to protect health. This arrangement may appear to be complicated. However, the situation is a counterpart of the civil arrangement whereby the construction and maintenance of city water supply and sewage disposal systems are handled by the city engineer or by a special board, while the board of health advises concerning sanitary aspects that may affect the health of the community.

The officers of this branch have initiated surveys of practically all the water supplies and the sewage plants serving Army posts in this country. They have found many defects and have collaborated with the Corps of Engineers in their correction. They are also concerned with the sanitary facilities in the large hotels and other dormitories which have been taken over by the Army and with special methods for safeguarding military water supplies from sabotage.

Another important function is close collaboration with the Corps of Engineers in the initiation and planning of insect and rodent control programs for posts in the Zone of the Interior. During the last two years more than 400 sanitary engineers and 140 entomologists have been commissioned and assigned to key positions throughout the Army. In 1941 the Army's mosquito control program in the United States cost about 2 million dollars, and the malaria rate was 1.8 per 1,000. In 1942 the cost was 3 million dollars and the malaria rate only 0.6 per 1,000. This was the lowest rate ever recorded

for the Army. This campaign was supplemented by the extramilitary mosquito work of the U. S. Public Health Service.

The Laboratories Branch—The Laboratories Branch is concerned with the formulation and the accomplishment of policies and activities designed to provide, maintain, and improve the various types of medical laboratory services required for the Army. Diagnostic laboratory services are made available for all Army hospitals; and laboratories for epidemiological, sanitary, and research work are also provided for the prevention of disease both at home and abroad. The quality of the services afforded by both types of laboratories depends on the adequacy of trained personnel, quarters, equipment and supplies, and the use of suitable technical methods. Earlier there was some difficulty in obtaining sufficient numbers of physicians trained in bacteriology and the other laboratory specialties. This problem has been solved in part by the utilization of non-medical specialists who are commissioned in the Sanitary Corps and assigned to work in laboratories under the supervision of Medical Corps officers. The Laboratories Branch has been of great assistance to the health program of the Army by providing an effective laboratory service.

The Military Occupational Hygiene Branch—The Occupational Hygiene Branch has been established since the beginning of the present emergency in order to safeguard the health of civilian workers in the essential war industries owned and operated by the Army. These workers who are manufacturing the weapons of war are just as essential to the war effort as are the soldiers who use the weapons. The soldier temporarily incapacitated by measles or a bayonet thrust, represents a loss to the war effort. So also the munitions worker who is absent from his or her work bench or the assembly line, because of typhoid fever or smallpox,

represents an inexcusable delay in the output of the essential instruments with which the war must be won. The protection of the health of these workers is therefore as much a matter of concern to the Army as is the health of the soldier.

This branch, working through Service Command Surgeons, supervises the emergency medical service in Army operated industrial plants and depots. It is also concerned with the hygiene of working conditions and the elimination of occupational health hazards. It maintains a central industrial hygiene laboratory which makes surveys of all our military industrial plants in order to improve the health of the workers. This branch has also been concerned with the procurement and assignment of experienced industrial medical officers.

Another important activity which has been developed under this branch is the organization at Fort Knox of the Armored Force Medical Research Laboratory. This laboratory has been established for the purpose of studying the hazards intrinsic in the operation of tanks and other mechanized warfare vehicles. These hazards include exposure to toxic gases, heat, dust, and trauma in tanks. Much valuable information concerning the operational dangers of mechanized warfare is being afforded by the studies made in this laboratory.

The Occupational Hygiene Branch maintains liaison with all other governmental and civilian agencies concerned with industrial hygiene. It has also assumed responsibility for the supervision of industrial health and environmental sanitation in certain contractor-operated plants located on War Department property. These plants are surveyed by the Industrial Hygiene Division of the National Institute of Health, with which close contact is maintained. It is estimated that the

Army's Occupational Hygiene Branch is concerned with preserving the health of more than 1½ million civilian employees in the Army operated plants alone.

The Epidemiology Branch—The Epidemiology Branch is responsible for the formulation of general policies concerning the control of infectious diseases. Its officers assemble and analyze data on the current prevalence of disease among troops, and investigate any abnormal incidence of infection. This branch keeps its fingers on the pulse of the Army, and is ever watchful to detect the first signs of danger from communicable diseases, in order that it may advise the local medical officers as to the measures required for control. It includes several sections, one of which is concerned primarily with the administrative and technical supervision of the Army's immunization program.

Early in 1940 The Surgeon General began to expand this immunization program in order to meet the new disease conditions of war. It now includes the following important procedures: All troops are vaccinated and revaccinated against smallpox, typhoid fever, and the para-typhoid fevers A and B. They are also immunized actively against tetanus, using a series of injections of liquid tetanus toxoid. This new measure is considered to be of the greatest value in the protection of the wounded. An effective vaccine against yellow fever has been made available and the Army has used this material to protect all of its troops in areas where yellow fever exists. Promising vaccines against typhus fever are now available and in use among troops going to regions where louse-borne epidemics of this disease are apt to occur. Provisions have also been made to use cholera and plague vaccines in the attempt to immunize individuals going to regions where these diseases are endemic. The exact degree of protection afforded by these typhus,

cholera, and plague vaccines is not known, and therefore the Army does not rely on the use of vaccines alone, but insists on the additional use of all indicated sanitary procedures. This section also assists in planning for the procurement, supply, and distribution of all the prophylactic biologicals used by American troops throughout the world. The present immunization program is considered one of the most potent weapons being used for the preservation of the health of the Army. Undoubtedly many thousands of American soldiers will owe their lives to the protection afforded by these immunizing agents.

Another important section is the one devoted to the control of tropical diseases. Since the Spanish American War, the Army has had a rich experience with such diseases in the tropical possessions which were acquired at that time from Spain. Consequently, medical officers of the regular army have made important contributions to our knowledge of tropical medicine. As we passed from the recent period of emergency into the present state of war, American troops were sent to many new tropical frontiers, first in the western hemisphere and later throughout the world. This introduced new and difficult problems in disease control.

The most important tropical disease to which United States troops will be exposed is malaria, which is the most widespread disabling disease in the world. Other insect-borne diseases are potentially dangerous and so are the intestinal infections, especially cholera, the dysenteries, and the diarrheas. The tropical disease section has exerted leadership in planning an effective military program for the control of such diseases. This program includes the organization of special teams of highly trained control officers for duty in overseas theaters, the initiation of extensive programs for the training of medical

officers and of civilian teachers in tropical medicine, the maintenance of liaison with those responsible for the procurement of the special personnel, equipment and supplies needed, and coöperation with the research agencies concerned in the development of new procedures for the control of tropical infections among troops. The infection rates in certain overseas regions where protection is difficult are relatively high. However, in spite of the exaggerations of certain sensational writers, both lay and medical, a relatively effective program of disease control has been provided for all such areas.

The Civilian Board for the Control of Epidemics—One of the most effective agencies developed as a part of the Army's preventive medicine program, is the "Board for the Investigation and Control of Influenza and Other Epidemic Diseases in the Army." This board which was established by the Secretary of War in January, 1941, on the recommendation of The Surgeon General, is an example of the effective collaboration which has existed between the Preventive Medicine Division of the Army and the leading civilian specialists of the country.

The board operates as a part of the Preventive Medicine Division under the immediate supervision of the Assistant Director, Colonel S. Bayne-Jones. The central body of the board consists of the following seven members: Dr. Francis G. Blake, President, Drs. Oswald T. Avery, Alphonse R. Dochez, Ernest W. Goodpasture, Kenneth F. Maxcy, O. H. Perry Pepper and Andrew J. Warren. In addition there are 104 members of commissions, making a total of 111 civilian specialists in infectious diseases who are attached through the board to the Office of The Surgeon General. All of these members hold appointments as special consultants to the Secretary of War.

The broad objectives of the board

are two-fold. Primarily its function is to act as an advisory body to The Surgeon General and to be ready at any time for temporary duty in the field in order to combat epidemics or threatened epidemics. Its other function is to conduct continuing investigations, either in the field or in civil institutions, on practical problems of military preventive medicine. The Surgeon General has repeatedly called on the board or groups of its members for advice and assistance. In addition to projects for investigation, approved in advance, numerous emergency field studies have been made by members of the board and its commissions at the request of the surgeons of Service Commands or of Posts in various parts of the Army. The arrangements for these field investigations have such flexibility that it is possible at times to place consultants in the field or to have them on their way to posts within a few hours after requests for assistance have been received and approved. At present ten commissions are organized under the board. These are as follows: (1) The Commission on Acute Respiratory Diseases, of which Dr. John Dingle is the Director. This group is now stationed permanently at Fort Bragg, N. C. (2) The Commission on Cross Infections in Hospitals, under Dr. Oswald H. Robertson. This group is concerned with the study of various methods for reducing the number of pathogenic bacteria and viruses in the air of hospitals and barracks. (3) The Commission on Epidemiological Survey was formerly under Dr. S. Bayne-Jones and is now under Dr. Francis G. Blake. It has been concerned with continuing bacteriological surveys among troops in various parts of the country, in order to establish base lines during inter-epidemic periods for comparison with the prevalence of types of bacteria in periods of outbreaks of respiratory diseases. It is hoped that useful predic-

tions may be made in advance, on the basis of changes in prevalence of such organisms as streptococci, influenza bacilli, or meningococci, and that the information gained may be applied promptly to the control of epidemic diseases. (4) The Commission on Hemolytic Streptococcus Infections, formerly under Dr. M. Henry Dawson, now under Dr. Chester S. Keefer, is concerned with the control of streptococcal infections of the respiratory tract. (5) The Commission on Influenza, under the directorship of Dr. Thomas Francis, Jr., is organized to assist in dealing with influenza on a country-wide scale in Army posts if an epidemic should occur. (6) The Commission on Measles and Mumps under Dr. Joseph Stokes, Jr., is concerned with problems of the epidemiology, prevention, control, and treatment of these diseases. (7) The Commission on Meningococcal Meningitis, formerly under Dr. Perrin H. Long, and now under Dr. John Phair, is concerned with the development of effective methods for the control of that disease. (8) The Commission on Neurotropic Virus Diseases under the direction of Dr. John Paul, is concerned with studies of poliomyelitis, lymphocytic, choriomeningitis, equine and encephalomyelitis, St. Louis encephalitis, and other diseases. (9) The Commission on Pneumonia is headed by Dr. Colin MacLeod. (10) The Commission on Tropical Diseases, under Dr. Wilbur A. Sawyer, includes specialists in many important tropical diseases. It has been used extensively in the field.

It may be stated that this board represents a powerful part of the Army's defense against disease. It places at the disposal of The Surgeon General the best available skill and facilities, for research in military preventive medicine. The members of this board are not only helping to win the war, but they are contributing ma-

terially to our knowledge of infectious diseases.

The Venereal Disease Control Branch—The Venereal Disease Control Branch is responsible for the formulation of policies, and plans for the prevention of such diseases among troops. It is concerned with the procurement and training of special venereal disease control officers for assignment to key positions throughout the Army. Working through these officers the branch has as its objective the execution of a rigorous control program based on the following: the repression of prostitution; the encouragement of continence; provision of prophylaxis for those exposed; collaboration with civil authorities in the detection of sources of infection; provision of medical care for the infected; and, finally, the education of all military personnel regarding the strategic importance of preventing venereal infections. Obviously this program requires close collaboration with all local and federal health and law enforcement agencies. During World War I the venereal diseases caused more loss of time than any disease except influenza. It is gratifying to report that in no month of the current conflict has the admission rate been as high as the lowest monthly rate of the last war. Contrary to popular notion, the prevalence of venereal infections, acquired in the Army, is not appreciably greater than that for comparable groups in the civil population.

The Medical Intelligence Branch—The Medical Intelligence Branch is a unique part of the Preventive Medicine Division. This branch was started during 1940 in order to collect, assemble, and disseminate in the Army specific information about health and disease conditions in foreign countries. The need for such information is obvious. It affords an exact basis for planning the measures and equipment necessary to protect our forces in foreign countries.

For example, knowledge that malaria exists in a certain country is of limited value unless it is supplemented by information as to the anopheline vectors peculiar to that region and their breeding and feeding habits. The need for such exact detail is apparent when one realizes that two closely related malarious regions may be infested with mosquito vectors so different in their habits, that control measures which are effective in one of the areas might be actually harmful in the other.

The information is collected from many sources including medical libraries, current literature, Army and Navy Intelligence Service, other governmental and civilian health agencies, and individuals recently returned from foreign countries. In many instances such information has been supplemented by the reports of Army sanitarians sent abroad to make personal investigations and sanitary surveys.

After collection, the information is studied and used to prepare comprehensive health surveys. Each survey includes data on the topography, climate, and population of the country; also a brief section dealing with the public health services and the facilities for sanitation and medical care; and detailed information concerning the important diseases and their epidemiology. These surveys form the medical sections of the War Department strategic surveys, and are furnished to the commanding officers and the medical officers of all forces going to foreign countries. They are also used as a basis for the specific recommendations made for the protection of the health

of all troops sent abroad, and they are sent to various teaching institutions in the Army and are used extensively by individual officers preparing for foreign duty. The activities of the Medical Intelligence Branch are an important part of the preventive medicine program.

CONCLUSION

In this brief discussion of the Army's program of preventive medicine details have been avoided. Only some of the broad objectives and the general scope of the program have been considered.

The Division of Preventive Medicine has been created in The Surgeon General's Office to plan for and exercise general supervision over the preventive aspects of military medicine. It serves as a policy forming agency which can coordinate the experience of the forces in the field and provide for the development of sound preventive practice.

In the evolution of its present program the Army has had the assistance of numerous civil agencies, both official and voluntary, and the advice of countless civilian specialists. To read the roster of those who have participated in this cooperative program would mean essentially calling the roll of the country's outstanding medical institutions and investigators.

The execution of the preventive medicine program is a responsibility which must be shared by every individual in the entire military force. The effectiveness with which it is executed will depend on the intelligence and zeal with which individual medical officers carry out the primary mission of the Medical Department.

Home Drying Methods and Their Effect on the Palatability, Cooking Quality, and Nutritive Value of Foods*

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AS my title suggests, I am presenting home dehydration as a problem somewhat apart from commercial dehydration and commercially dehydrated products. The reason is doubtless obvious: relatively crude equipment, lack of technical knowledge or skill on the part of the homemaker, limitations of time and space, and variability in quality and amount of material to be dehydrated are factors which tend to limit the degree of uniformity which can be expected in home dehydration at present.

Our research is definitely aimed at improvement of home dehydration equipment and at making available practical directions for home dehydration which will enable the homemaker to develop skill and to make the best use of her space, equipment, and home-grown produce. At the same time, we have been studying the edible quality and to some extent the nutritive value of home-dehydrated fruits and vegetables. The present results in this field of research give us merely a picture of what may be expected in home-dehydrated products made according to present knowledge and facilities. We

believe that edible quality and nutritive value of home-dehydrated foods may be improved as better methods and better equipment are made available to the homemaker.

Work on edible quality includes problems of rehydration and cooking of the plain material and of its preparation in various recipes. Palatability studies are of prime importance because they are used (a) as a means of evaluating the dehydration process itself, (b) as a means of evaluating different storage conditions, and (c) as a basis for judging the value of the rehydrated and cooked product and of the recipes developed for the use of dehydrated products. Obviously, the most nourishing food is of no avail if it does not taste good enough to be eaten by the family.

Nutritive value is important because, once a product of acceptable edible quality has been produced, the question immediately faced is that of whether the eating of a dehydrated food assures the consumer of nutrients similar in kind and amount to those found in the same food when fresh, canned, or frozen. Some nutrients which are destroyed by heat, oxygen, or light are known to decrease after ordinary cooking or canning. The fact that some nutrients may be lost during dehydra-

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tion is not, therefore, a reason for condemning such a process. It is, however, reason for continuing to work on improvement of the process until the greatest possible conservation of nutrients, consistent with good keeping properties and good edible quality, is attained.

At the Bureau of Home Economics and in three cooperating states—California, New York, and Texas—much attention has already been given to home dehydration. Due to scarcity of strategic materials, it was not possible this year for many families to obtain pressure cookers for processing non-acid foods. By 1943 it is possible that cans and gaskets of suitable quality may also be difficult to get. Starting with the literature available from *Farmers' Bulletin 984*¹ and from the various experiment station and extension service leaflets, the preparation, drying, and storing of various fruits and vegetables was begun. In this phase of the work, the dehydration process itself was carried on so as to permit some direct comparisons of the nutritive value of fresh and corresponding dehydrated samples of vegetables of known variety and cultural history.

EQUIPMENT AND METHODS

Driers—Two cabinet driers were constructed for use over kerosene heaters according to directions by Cruess,² issued by California Agricultural Extension Service. Recently a new edition of this leaflet has been issued.³ Trial runs on one sample of beef and several vegetables were made according to Cruess's directions. With the cooperation of the Housing and Household Equipment Division of the Bureau, modifications based on this experience were made in the construction of the drier. This is described in a recent bureau publication.⁴

A drier of tunnel type with electric heater and fan which had been de-

veloped experimentally by the Rural Electrification Administration and sent to us for practical drying tests was also used. This was modified by the Housing and Household Equipment Division in the light of our exploratory experiments. Two other electric driers were used for some tests but were not available for intensive experimentation. A few tests using range ovens have been made. One drier which sits on the top of a gas range is now being tested.

Choice of foods for drying—Sweet potatoes, snap beans, and leafy greens were first chosen for particular attention because they represented different types from the point of view of nutritional value and drying qualities. Quantities of the first two of known variety and cultural condition were available by courtesy of the Bureau of Plant Industry. As time permitted and foods were available other kinds were dried.

Preparation for drying—Using existing directions for home and commercial drying as a basis, procedures for each food studied were adopted or developed with the manifold purpose of:

1. Preparation in a form suited to quick and efficient drying
2. Preservation of edible quality
3. Preservation of nutritive value
4. Use of existing home kitchen facilities and minimum of special supplies or equipment
5. Economy of housewife's time

Frequently, a compromise has to be made in final directions for drying because a method which is optimum for one purpose is least desirable for another.

Objective 1 usually is accomplished best by dividing material into small pieces for quick penetration of heat in the pretreatment and quick evaporation of water during drying.

Objectives 2 and 3 are accomplished best by the method which assures quick and complete destruction of enzymes during pretreatment, minimum loss of

soluble nutrients, and minimum temperature and length of time for drying. Steaming until almost done was the most effective method found.

Objective 4 is accomplished by avoiding when possible the use of special chemicals such as lye or citric acid (commonly used for commercial dehydration) and improvising ways of steaming relatively large quantities with materials available in most rural homes.

Objective 5 is frequently difficult to reconcile with objective 1, since peeling, cutting of small pieces, and careful spreading on trays are time consuming. Methods were avoided, however, which seemed to require a prohibitive amount of preparation time.

Sampling—Careful plans were made to assure adequate sampling of the food as purchased, as prepared for drying, after pretreatment, after drying, and for storage studies. Results in our own and other laboratories indicate that proper sampling is often difficult and that improper sampling leads to conflicting evidence and undependable conclusions.

The drying process—Automatic recording of temperatures measured by thermocouples placed at various points in the loaded driers was arranged by the Equipment Division. Measurements by means of household thermometers were made at intervals. These make possible a comparison of the drying temperatures found effective in each home drier with those appearing in the literature as applying to elaborate commercial dehydrators. Eventually some translation of the safe temperature range as measured by the thermocouples into terms of a household thermometer placed at a convenient place on the drier will be made. More exhaustive studies of physical aspects of the running of the driers are contemplated by the Housing and Household Equipment Division.

Each food presents a new problem in each drier. In general, existing directions were followed when available and in the light of experience modifications were made.

In the kerosene drier, the Cruess directions were to change trays every half hour so as to avoid overheating of the food on the lower trays and inadequate heating of the trays above. Longer time intervals throughout or at the later stages of drying have been tried and recommendations developed as a result of these investigations.

No changing of trays is necessary in the modified electric drier.

Tests for dryness—Laboratory determinations for moisture were made at the end of the drying process as a check on the rule of thumb directions given for homemakers in *Farmers' Bulletin* 1918.

Packages and storage—In general, the packages of the dehydrated product were determined by what would be available to the homemaker. Glass jars, tin cans, or other containers which could be hermetically sealed were used. Also waxed paper cartons, paper bags, etc., were used for storing miscellaneous samples.

Due to limitations in amounts of dehydrated material for direct comparison on storage studies, only two variables could be studied on each run, e.g., 2 packages at one temperature for 1 length of time, 1 package at one temperature for 2 lengths of time, or 1 package at two temperatures for 1 length of time. Temperature levels represented a range of from 0° F. to 105° F. Humidity was not controlled, but for the permeable or semipermeable containers, storage in the Beltsville laboratory represented high relative humidity a large part of the time.

PALATABILITY TESTS

Organoleptic tests are necessarily subjective in nature and it is difficult to

set up objective standards for evaluation of palatability. Judging of foods has long been a part of the work of the Food Utilization Section. Moreover, a judging panel of members of the Bureau of Animal Industry and Bureau of Home Economics staffs has been working for some years on meat and poultry tasting.

The dehydration work, however, presented such a large volume of tasting to be done on such a wide variety of foods, and the results of such tests were so important because they were the basis of decisions as to successful processing, that it was decided to develop if possible a more objective method of selecting judges and of setting up judging panels. For that purpose, a system was developed for testing individuals for their sensitivity to odors and to four basic tastes: sweet, sour, bitter, and salt.

On the basis of these tests, individuals who showed poor sensitivity were eliminated as judges. The others were called upon as needed and when available.

Cooked dehydrated products were scored by a panel of five judges for appearance, odor, flavor, consistency, and acceptability. The definitions of the judging terms are (1) excellent—quality equal to the best fresh, (2) good—satisfactory, (3) fair—below average, but not objectionable, (4) poor—objectionable but edible, (5) very poor—inedible.

Snap beans—Snap beans were not in prime condition when received. They rated "good" when cooked but fresh beans should be "excellent." Beans were shredded lengthwise, because in preliminary tests they were the only ones that retained any vitamin C. Snap beans were soaked in 15–20 times their weight of water (well covered) for 2 hours; then cooked in a covered pan with salt added, until tender. Butter was added.

They rated "fair" when dried as compared to "good" when fresh. Some experienced tasters considered the dried beans on a par with or better than canned.

After cooking there was considerable water remaining which had a strong, unpalatable flavor. This was discarded although it is obvious that soluble nutrients were discarded also. We plan to study more exhaustively possibilities of cooking so as to conserve both palatability and nutritive value in the food as served.

Beets—Beets, when fresh were scored "good" and maintained this score after precooking, dicing, dehydrating, reconstituting, and cooking. Precooked sliced beets of the same lot scored only "fair," however.

Carrots—These were scraped and then cut crosswise, diagonally, in lengthwise strips, shredded or diced. From palatability scores on the dehydrated product, it seems that crosswise slices, diagonal slices or shreds rate highest. These cuts reconstitute more completely and have a nicer appearance than the others.

Dehydrated carrots were soaked 1–2 hours in 10 times their weight of water and cooked until tender, from 4 to 24 minutes.

Sweet potatoes—Sweet potatoes were steamed until tender, peeled, cut lengthwise in slices $\frac{1}{4}$ inch thick, and dipped in a 2 per cent citric acid solution. The acid improves the color and gives a slightly sour flavor to the sweet potato.

Dehydrated sweet potatoes were soaked in 4 times their weight of water (just covered) for 1–2 hours or until plumped. They were cooked in the soaking water until tender, 10–30 minutes. The cooking water was discarded because of its sickening sweet flavor. Butter was added.

Most of the fresh sweet potatoes rated "good," only one was "excellent." After dehydration they rate

from poor to good, depending upon variety and method of dehydration.

KEEPING QUALITY OF DEHYDRATED VEGETABLES

Sweet potatoes—Dehydrated sweet potatoes stored in used coffee tins compared favorably with those stored in glass jars, tightly closed.

Nancy Hall sweet potatoes retained their original quality after 2 months' storage in a cardboard box at 74° F. and around 50 per cent relative humidity.

Mayonnaise jars without a rubber ring ranked as high as airtight fruit jars with a rubber ring and sealed with paraffin, stored at high humidity and a cool temperature.

The palatability of one lot of dehydrated sweet potatoes held at different temperatures packed in airtight glass jars showed after 2 months' storage edible quality ratings of "very good," "good," and "fair," at 45° F., 74° F., and at 100° F., respectively. These potatoes were not treated with citric acid before dehydration and therefore may have been more easily affected by higher temperatures than those treated with citric acid before dehydration. The palatability scores for a citric acid treated sweet potato show better keeping quality with no appreciable difference attributable to temperature or storage container. This citric acid treatment had been recommended by Caldwell in *Farmers' Bulletin* 984.

After 2 months' storage no differences were apparent between the sweet potatoes packed in an inert gas, such as nitrogen, and in air.

A study was made on sweet potatoes which had been held in storage at the Bureau of Plant Industry for about 6 months. They were in good condition. All were given the same pretreatment and were dehydrated under uniform conditions in the electric drier.

Five varieties of sweet potatoes ranging in color from deep orange through light orange and straw-colored to grayish-cream rated "fair" to "good" in palatability when (1) cooked fresh, and (2) precooked after citric acid dip. With but one exception, the citric acid treated sample rated the same or better than the plain potato, and in all cases the freshly dehydrated rated the same or better than the freshly cooked.

The palatability after 3 months' storage at 32° F. remained as good as before storage in two samples; but had dropped about 1 point in three instances (from "good" to "fair" in two, and from "very good" to "good" in one).

The storage study is very incomplete at present. Many foods have not been tested at all, and others have been tested after 1, 2, or 3 months only.

Greens—Mustard greens and chard were stored at room temperature in friction top tin cans and waxed paper cartons, respectively. Mustard greens showed no appreciable loss in palatability after 2 months' storage at room temperature.

After 2 months' storage at room temperature, the palatability of four samples of chard has decreased more than after 1 month in comparable vegetables. Further tests are needed before any definite statement of trend can be made.

Snap beans—Snap beans stored at 100° F. exhibited a color change to a tan shade whether stored in airtight or non-airtight containers. However, this lot of beans before storage were a yellowish green and not of very good quality.

In two preliminary experiments dehydrated beans have been tested after 6 months' storage. At this time they rated "fair" in palatability and were green in color. This is as good or better than most of the freshly dehydrated snap beans.

Since our data on the keeping quality of beans at various temperatures is very meager as yet, it is impossible to say that dehydrated snap beans deteriorate faster at high temperatures than low when packed in airtight or non-airtight containers.

NUTRITIVE VALUE OF HOME-DEHYDRATED VEGETABLES

Vitamin and mineral losses during preparation, dehydration, and storage were studied on several foods dehydrated by home methods in the Bureau of Home Economics laboratories. Calcium, phosphorus, and iron were determined on sweet potatoes, turnip greens, snap beans, and beets. These vegetables were steam blanched before dehydrating. The results showed a loss in mineral content of about 20 per cent, with the greatest loss occurring in phosphorus and the least in calcium. Theoretically, there should be no loss of minerals during actual dehydration. Mineral determinations are made, however, as a check on our sampling procedures.

The following are the findings on the vitamins:

Sweet potatoes—Steam blanched, no change in carotene; 20 per cent ascorbic acid is lost by this pretreatment. After dehydration by the Rural Electrification Administration electric drier, no loss in carotene; only 11 per cent of the ascorbic acid is retained; after cooking the fresh, dehydrated sweet potatoes, no change in carotene but considerable loss in vitamin C occurred. After 2 months' storage at 74° in glass jars under CO₂, kept in the dark, there is no change in these vitamins.

Turnip greens—During pretreatment, which was steaming, there was 25 per cent loss in the vitamin C content. Using the same method of pretreatment, but for a period of two to three times as long as the first, there was 67 per cent loss of vitamin C. A kerosene

drier was used and the drying period was about one-third longer than the one used on the sweet potatoes. Where the electric drier was used, there was about the same loss (65 per cent) in vitamin C.

Snap beans—During steam blanching, there was a 30 per cent loss of ascorbic acid. The drying methods consisted of (1) hanging on strings at room temperature for 6 days—all ascorbic acid was destroyed; (2) Rural Electrification Administration electric drier—35 to 50 per cent loss in ascorbic acid, depending upon the length of drying time.

In the string beans, the carotene content of the starting material was not too great to begin with; what there was appears to be practically all destroyed by these methods of drying.

Of interest in the case of the snap beans is the fact that during pretreatment, preparation of the vegetable is a factor as to the degree of loss in ascorbic acid. The loss of this vitamin is greater when the bean is steamed whole than when steamed shredded or cut. This may be explained by the fact that the heat penetrates the bean tissue to a greater degree in the shredded or cut bean, and destroys the enzyme more effectively.

CONCLUSION

In conclusion, it must be remembered that these results are only an indication of what happens during dehydration, since the methods have not yet been perfected. When these foods were dried, the number of foods was necessarily limited and our storage studies are still in progress.

In general, it may be said that many foods can be dried in simple apparatus to form a palatable product. The retention of nutrients depends considerably on the degree of control made possible by a given drier, but can be controlled to some extent by the use of

good methods of preparing for the drier. For any given food, the palatability depends not only upon the drying, but on the method used for rehydration and cooking, and on the quality of the fresh material. Moreover, no matter how good the freshly dehydrated product may be, adverse storage conditions result in loss in edible quality and nutritive value. The problem of home storage of dehydrated vegetables must not be forgotten, particularly since the kinds of container available are limited and facilities for cool dry storage are not available for many families.

Work is still going on in the bureau and in certain experiment stations. The

results from other experiment stations have not been reported here but will soon be available.

There is reason to believe that better driers, better methods of drying, and more information on necessary conditions for storing will be developed.

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Blood and Malaria Parasite Staining with Eosin Azure Methylene Blue Methods*

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IN 1939 it became apparent to those interested that many field workers in malaria were using Grüber's Giesma stain for thick film work, and were unable to obtain results satisfactory to them with the Giemsa stains then manufactured in the United States. The difficulty was that when staining at pH 7.0, which seems best for thick film work, the German stain gave a clear, light blue coloration to plasmodial and lymphocyte cytoplasm and a sharp reddish-purple chromatin stain, whereas American samples then available gave a grayish-lilac cytoplasmic coloration and a denser red-purple chromatin stain. This gray-lilac was difficult to distinguish in the similarly but less intensely stained background of detritus in the thick film, and from the gray-pink cytoplasm of red corpuscles at pH 7.0.

In attempting to solve the difficulties the available pure dyes of the methylene blue thionine series were tried in combination with eosin and with each other. To afford greater ease in manipulation, we decided to use the Nocht method, which consists in using 1:1,000 solutions of eosin and thiazin diluted in buffered water, on account of its extreme flexibility.

Azure B turned out to be the best single dye, although MacNeal and others had thought this dye of relatively low value. It was also found that the desired depth of cytoplasmic and background staining required a slight excess of basic dye over the amount equivalent to the eosin. This accords with Giemsa's original work.

Spectroscopic studies done at this time revealed that the imported Giemsa stain contained chiefly azure B and methylene blue, agreeing perfectly with our experimental findings.

Our first formulae were derived directly from the Nocht method. One consisted of methylene blue 270, azure B 200, azure A 50 and eosin 500 dissolved as such in 100 ml. of a mixture of equal parts of glycerin and methyl alcohol. This stain was highly satisfactory.

However, as soon as an attempt was made to translate this into commercial production, variation in dye content of the four dyes led to difficulties. So, believing that the precipitated eosinates would be of more constant dye content, further formulae were evolved on that basis, and the first few commercial samples were eminently satisfactory. Such samples consist basically of 50 mg. azure A eosinate, 250 mg. azure B eosinate, 200 mg. methylene blue eosinate and 100 mg. methylene blue

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

in 100 ml. of the glycerin and methyl alcohol mixture.

After a time this method in turn broke down and the spectroscopist showed that the difficulty lay in qualitative variation in composition of the azure B. One of the methods of making azure B is to oxidize methylene blue to crude azure A with hydrochloric acid and potassium bichromate and then again to reduce this with formaldehyde by heating under a reflux condenser. This was supposed to yield only azure B. However, a trial of this reduction process in my hands has yielded on at least one trial almost pure methylene blue, as well as products spectroscopically intermediate between azure B and methylene blue.

It would appear that the commercial method of manufacture of azure B will have to be revised by introducing spectrographic control, by further study of the variation factors in the formaldehyde synthesis, or by going over to the partial-oxidation process which appears to yield quite constant products spectroscopically when the same proportions of chromate and methylene blue are used. This has been done and has been found to yield a more uniform product.⁹

However, with the coöperation of the Stain Commission and the dye companies, after excluding some samples which do not turn out well, we are now able to obtain on the market quite satisfactory Giemsa stain for blood and parasite work.

Turning to Wright's stain we find that commercial samples of this on the market, found in various laboratories and furnished for certification to the Stain Commission, vary considerably in staining capacity. Some samples yield pale blue nuclear staining with satisfactory light blue lymphocyte cytoplasm, good neutrophil and eosinophil granules and orange-pink-red corpuscles staining at pH 6.5 with a 1:2 dilution.

Such samples, though offered as Wright's stain, are essentially eosinates of unaltered methylene blue, or Jenner's stain. Spectroscopically these give absorption maxima between 660 and 665 for the thiazin, 515–518 for the eosin. I consider these unsatisfactory. Other samples give blue-violet to reddish-purple leucocyte and parasite chromatin, clear, light blue parasite and lymphocyte cytoplasm, good granules and orange-pink-red cells. Here absorption maxima range from 660 for the bluer samples to 645 or 650 for the redder. These are quite good for blood and parasite work. Still other samples give denser reddish-purple chromatin in white cells and parasites, more gray-lilac cytoplasm in lymphocytes and parasites, perhaps less satisfactory eosinophils, good azure granules and orange-pink-red corpuscles. Here absorption maxima range from 620 to about 640. Some workers prefer such samples for blood work, but they seem less satisfactory for malaria parasites, trypanosomes, etc.

Such variation occurs even in successive samples from the same manufacturer and appears to be inherent in the Wright method of polychroming. This calls for heating at about 98° C. for an hour, in relatively shallow layer, of 1 per cent methylene blue in 0.5 per cent sodium bicarbonate. Extended experimental work has shown that marked variations in such products are produced with variations in the amount of evaporation occurring, in exposure to air, in pH of the initial mixture, and apparently by taking the sodium bicarbonate out of different bottles.

However, by prevention of evaporation, by rigidly controlling pH by using standard buffer mixtures in place of the apparently variable sodium bicarbonate, and by close control of time, temperature, dye content of methylene blue and its concentration in solution, it is possible consistently to produce polychrome methylene blues in

the azure A or azure B range which will vary by less than 5 milli-microns in the position of the absorption band on repeated trial. So it would appear that, when the preference of workers as to color effect can be learned, it should now be possible to duplicate closely Romanowsky stains of Wright type in successive batches.

We have been greatly aided in these attempts at standardization of Romanowsky stains by study of their absorption spectra and the correlation of these with the staining capacity of the samples. It was my belief that a similar method of study would be valuable in determining the causes of deterioration of solutions in methyl alcohol or glycerin and methyl alcohol of these stains. Accordingly, studies were initiated last August using a number of samples of Wright's stain solution which had been on the laboratory shelves for intervals varying from 1 week or so up to over 3 years, as well as freshly prepared solutions of two samples, one with an original thiazin absorption maximum at 656, the other at 621 $m\mu$. To these latter various contaminants were deliberately added at 2 per cent concentration and spectra were run at intervals from 2 days up to 2 months at the present writing. The samples have also been tested as blood and parasite stains at the start and at the end of this period.

Summing up this work to date, old samples which no longer give satisfactory stains show absorption peaks generally below 615 $m\mu$, which represents a fairly pronounced shift from the original in many on which spectra were made when they were fresh. Crude chemical separations of some of these samples indicated formation of considerable amounts of methylene violets, apparently more than the remaining azures, though thoroughly satisfactory separations have not yet been worked out.

The deliberately contaminated samples all showed progressive shift of the absorption maxima toward 600 $m\mu$. This was fastest when repurified methyl alcohol was shaken with Na_2CO_3 and then filtered and used as a solvent. Acetone and formaldehyde both accelerated the shift, and methyl alcohol redistilled over silver oxide to destroy aldehydes showed a slower shift than commercial C.P. grade. Two per cent water had little appreciable effect. Formic acid seemed to act as a stabilizer for the thiazin, but this ruins the eosin component for staining purposes. However, after 2 months the repurified methyl alcohol solution had reached the same point as those contaminated with acetone or formaldehyde. Hence it would seem that the repurification of methyl alcohol was of little value.

However, the most obvious and striking finding was that solutions from the sample with an initial absorption peak at 656 were still good stains after 2 months in solution in pure, commercial, or acetone- or formaldehyde-contaminated methyl alcohol, while the solutions made from the sample with an initial maximum at 621 were all worthless in less than a month in spite of originally brilliant staining.

In the first instance absorption maxima were still above 630 after 2 months, while in the second they were below 615 in less than 2 months.

Hence it would seem that we should require initial absorption maxima for Wright's stains between 650 and 660 $m\mu$.

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Radio Listening Habits of Mothers Who Attend Well Baby Clinics

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HEALTH officers and health educators are concerned with the radio listening habits of mothers since, because of their positions in the home, they constitute a strategic health education audience. We undertook to secure information on this topic in the Boston Health Units by interviewing mothers.

A series of 250 interviews, lasting about 10 minutes each, were conducted at eleven health units and baby stations over a period of nearly 2 months. Experimental interviews supplemented thoughtful planning in deciding what information we should seek, and how the interview could best be conducted. Leading questions were avoided. Freedom of expression was encouraged. The series of questions which the interviewer had in hand were used as a guide in informal discussions rather than as a formal questionnaire for which categorical answers were sought. The validity and reliability of the findings were tested by a comparison of the tabulations on the analysis of the first 125 interviews with the tabulations of the second 125 interviews. These were remarkably similar.

Two hundred and fifty mothers were interviewed in the sequence in which they happened to come to the clinic waiting room, and they represented, therefore, a fair sampling of the women attending well baby clinics in Boston. The mothers interviewed were

a young group, 81 per cent of whom were under 35 years of age. They had a total of 471 children; their families range from one to eight children; the children ranged in age from 2 weeks to over 20 years, but 45 per cent of all the children were infants.

WHEN DO MOTHERS LISTEN TO THE RADIO?

Every mother, except one, owned a radio and she was about to purchase one. Despite the fact that they were from the low income group, 30 per cent of them owned from two to four radios each, so that the group of 250 mothers possessed 336 radios. Forty-eight per cent of these radios were located in the kitchen and 17 per cent in bedrooms. This means the mothers can listen while doing housework in these rooms. Seventy-seven per cent of the women said they always do housework when listening and practically never sit down to listen to the radio when idle. Ninety-four per cent said that at least one of their radios is conveniently located for listening during the day. Seventy-two per cent of the mothers listen every day, while 87 per cent are regular evening listeners. Eighty-two per cent claimed to be the person who usually turns on the radio in the home. An added 12 per cent said that they "frequently" turn on the radio themselves.

Eighty-seven per cent select, at least

part of the time, the programs they hear instead of just tuning in regardless of the station to which the dial is turned. Forty-seven per cent of this group always select the programs to which they listen. Only 13 per cent of the mothers interviewed never choose the programs they hear. There is less selection of programs in the daytime than in the evening. Of those reporting specifically on daytime listening habits, 33 per cent select their programs. Of those reporting on evening listening, 79 per cent select their programs. Despite low daytime selectivity, there is no one station the favorite of the majority of the mothers; 56 per cent expressed a preference for a particular station for daytime listening; 90 per cent of these choices were divided about equally among three well known Boston stations.

Eighty-six per cent of the mothers listen to programs between 7:00 P.M. and 10:00 P.M., while 92 per cent listen at least some time between 9:00 A.M. and 12:00 noon. The latter hours represent the best choice of listening-time for a peak audience composed chiefly of women.

ATTITUDES TOWARD HEALTH PROGRAMS

We sought to find out from the mothers whether they would like a health program, and if so what would be their preference as to the type of program presented and the hour preferred. In examining the data presented from this phase of the study, the reader should bear in mind that there may be a sharp difference between what the mother thinks she might like and what she would listen to if it were on the air. As a matter of fact, their expressed preferences do not square too well with their present listening habits.

The majority, 88 per cent, expressed themselves enthusiastically in favor of a health program, 10 per cent stipulating that they would listen if

the program proved interesting and entertaining, as well as valuable. Only 2 per cent of the interviewees said they would not listen to a health program. Fifty-eight per cent of the women prefer their health program to be on the air between 8:00 A.M. and 12:00 noon, while 19 per cent would find the hours between 6:00 P.M. and 10:00 P.M. most convenient. The remaining 23 per cent prefer afternoon hours. It is evident here that three times as many women prefer morning hours to evening.

The fifteen minute programs are the present favorites of the mothers, notably the so-called "soap operas" and the homemaking programs planned for women. Thirty-eight per cent of the mothers reported hearing at least one of the homemaking programs; 56 per cent told of following the serial dramas sponsored by the soap companies; and 11 per cent selected this latter form as their favorite of all types, while 6 per cent said they do not like the soap operas. Dramas of other types, broadcast both day and night, are enjoyed by 59 per cent of the mothers. Twelve per cent selected drama as their best liked program, while only 1 per cent said they do not like to hear stories on the radio. A low number of interviewees, 9 per cent, reported ever listening to any form of educational broadcast, and only two mothers chose this style as their favorite.

Some of the mothers contradicted their expressed tastes when choosing the style they preferred for the health education broadcast. Thirty per cent asked that the health program be presented as a talk, although only 9 per cent of them listen now to any form of educational program. They qualified, however, that the talk be "interesting—not dull or monotonous." What constitutes any of these qualities is an individual matter. It is difficult for a sponsor to satisfy all listeners. The interview was preferred by 15 per cent

and the discussion by 6 per cent. The former, particularly, is adaptable to health education material. Twenty-seven per cent chose the drama as the form most desired for reception of the health broadcast. As we recall from above, over one-half of the women listen to dramas and 23 per cent chose a dramatic form as the one best liked, while less than 1 per cent prefer educational programs. In view of these facts, we are not convinced that the health "talk" is the medium of choice.

Next, the mothers were asked what topics they would like presented in a health program. Extensive health knowledge was not to be expected in this group, and the lack of such information was reflected both in their inability to select health topics and in comments made during the interviews. One-third of the mothers had no topic to suggest. The other two-thirds suggested topics that fit into one or more of the following categories: food and nutrition, child training and growth, budgeting, clothing, personal hygiene, mental hygiene, communicable disease and household hints. As would be suggested by the fact that they were attending well baby clinics, most of the mothers wanted information about babies. Many did not seem to recognize their own health problems, for some who said they had no need of special help had very evident dental caries, eyestrain exhibited by frowns and

squints, underweight, poor personal hygiene, and other correctable conditions. Those who suggested a subject usually added that any topic both practical and timely would meet a need and would prove interesting.

SUMMARY

From a study based on 250 interviews with mothers who attend well baby clinics it appears that nearly all mothers can be reached by radio. The morning is the most favorable time for mothers to listen, 10 o'clock being the hour of choice by the greatest number of mothers. Although more mothers (30 per cent) suggested health talks than any other single form of presentation, the number suggesting either drama or interview-discussion totaled 48 per cent. This preference and their present listening habits both suggest that the program using more than one voice (interview or drama) should be widely used.

Building an audience will be necessary regardless of the station from which the program originates. This may be carried out through health department personnel and by posters in health units as well as by spot announcements and other common forms of publicity.

The careful measurement of a well developed morning radio program for mothers is needed to indicate its value in the general health education program.

Surveys of the Nutrition of Populations^{*}

2. The Protein Nutrition of a Rural Population in Middle Tennessee

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IN a previous paper¹ the general procedures and methods of a survey of the nutrition of a population in Wilson County, Tenn., have been given together with a description of the population and the results of the survey as they concern calories. The present report deals with the protein nutrition.

METHODS

Dietary: There were no special procedures with respect to the dietary study which require comment, the record of food consumption being obtained as previously described. Values for the protein content of the food were taken principally from *Laboratory Handbook for Dietetics*, by Mary Davis (Swartz) Rose.² When necessary these were supplemented by values from *The Fundamentals of Nutrition*, by Hawley and Maurer-Mast,³ *The Farmer's Bulletin, Rabbit Raising*, U. S. Department of Agriculture,⁴ and *The Structure and Composition of Foods*, by Winton and Winton.⁵ In a few instances when reported values were not available, values were arbitrarily assigned. In no case

were such instances of sufficient importance to modify the significance of the results. Details of the values are given in the working tables.[†]

History and Physical Examination—The only practical evidence of protein deficiency which can be obtained from the history and physical examination in a survey such as this is the occurrence of edema not attributable to other causes. This was, therefore, a point of particular inquiry in the history and on the examination. The usual clinical manifestation of edema, pitting on pressure, served as the sign of abnormality.

Laboratory —Serum proteins were determined in part by the macro-Kjeldahl method using Howe's procedure for separation of the protein fractions,⁶ and in part by the biuret technic as described by Robinson and Hogden.⁷ The Kjeldahl procedure though reliable, accurate, and a standard procedure, is costly in time and reagents. The biuret test was found to be reliable with "normal sera." However, extensive studies on sera in disease other than protein deficiency revealed discrepancies when compared

^{*} The Studies referred to herein were conducted under the auspices of the International Health Division of the Rockefeller Foundation of New York City by the Nutrition Unit of the Departments of Medicine and Biochemistry of the Vanderbilt University School of Medicine, Nashville, Tenn.

[†] Copies of these tables are much too lengthy for publication with these reports. They can be furnished by special arrangement by writing to the authors, as may copies of record forms used.

with duplicate Kjeldahl determinations. Therefore, while the procedure appears to be satisfactory when applied to an essentially "normal" population in which only an occasional false value might be gotten, it does not appear as reliable for general use as the Kjeldahl procedure.

RESULTS

The results are shown in the accom-

panying tables and charts. The total intake of protein was low in a large number of the subjects (Table 1). By far the majority had an intake less than 70 gm. which is the minimum recommended allowance of the Food and Nutrition Board for any except children under 10 years and adult women, for whom recommended allowances are 60 or less. Many had an intake of less than 50 gm. Low intakes (below 50

TABLE 1

*Total Protein Intake among Persons in the Survey
Distribution of Total Protein Intake According to Age, Sex, and Race**

| Total Protein Intake | Age in Years | | | | | | | | | | Total |
|----------------------------|--------------|------|------|-------|-------|-------|-------|-------|------|------|-------|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 13-15 | 16-20 | 16-20 | 21+ | 21+ | |
| | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | |
| | M-F † | M-F | M-F | M-F | M | F | M | F | M | F | |
| Grams | | | | | | | | | | | |
| White | | | | | | | | | | | |
| <25 | 8 | 2 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 18 |
| 25- 49 | 26 | 24 | 22 | 19 | 2 | 11 | 1 | 7 | 19 | 96 | 225 |
| 50- 59 | 2 | 10 | 13 | 12 | 3 | 5 | 2 | 5 | 31 | 50 | 133 |
| 60- 69 | 1 | 7 | 15 | 4 | 2 | 1 | 6 | 7 | 28 | 37 | 108 |
| 70- 79 | 3 | 4 | 8 | 6 | 1 | 2 | 6 | 8 | 35 | 15 | 88 |
| 80- 89 | 1 | 0 | 2 | 4 | 8 | 0 | 6 | 0 | 30 | 16 | 67 |
| 90- 99 | 0 | 1 | 0 | 2 | 1 | 0 | 7 | 1 | 24 | 2 | 38 |
| 100-109 | 0 | 0 | 1 | 0 | 0 | 0 | 4 | 1 | 22 | 4 | 32 |
| 110-124 | 0 | 0 | 1 | 2 | 1 | 0 | 3 | 0 | 10 | 1 | 18 |
| 125+ | 0 | 0 | 1 | 0 | 3 | 0 | 2 | 0 | 19 | 1 | 26 |
| Unknown | 0 | 0 | 0 | 1 | 0 | 0 | 3 | 3 | 10 | 4 | 21 |
| Total | 41 | 48 | 66 | 51 | 21 | 19 | 40 | 33 | 228 | 229 | 776 |
| Mean Intake | 38 | 48 | 56 | 57 | 83 | 48 | 87 | 60 | 82 | 56 | 64 |
| Standard Error of Mean | 2.77 | 2.36 | 2.67 | 3.16 | 6.46 | 3.06 | 3.62 | 3.52 | 1.82 | 1.08 | 0.97 |
| Standard Deviation | 17.7 | 16.3 | 21.8 | 22.3 | 29.6 | 13.3 | 22.0 | 19.3 | 26.9 | 16.2 | 26.7 |
| Median | 37 | 48 | 56 | 54 | 83 | 46 | 86 | 63 | 79 | 53 | 60 |
| Colored | | | | | | | | | | | |
| <25 | 20 | 7 | 3 | 2 | 2 | 0 | 0 | 1 | 1 | 12 | 48 |
| 25- 49 | 12 | 15 | 18 | 17 | 3 | 11 | 5 | 14 | 25 | 51 | 171 |
| 50- 59 | 1 | 1 | 1 | 4 | 1 | 1 | 3 | 5 | 18 | 15 | 50 |
| 60- 69 | 0 | 1 | 2 | 3 | 3 | 1 | 4 | 3 | 15 | 7 | 39 |
| 70- 79 | 0 | 0 | 0 | 3 | 0 | 0 | 7 | 1 | 12 | 4 | 27 |
| 80- 89 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 10 | 2 | 17 |
| 90- 99 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 7 | 0 | 8 |
| 100-109 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 5 | 0 | 7 |
| 110-124 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 125+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| Unknown | 1 | 0 | 2 | 0 | 1 | 2 | 1 | 0 | 3 | 5 | 15 |
| Total | 34 | 24 | 26 | 31 | 15 | 15 | 22 | 24 | 98 | 96 | 385 |
| Mean | 23 | 31 | 38 | 48 | 60 | 44 | 64 | 44 | 65 | 42 | 48 |
| Standard Error of Mean | 1.95 | 2.71 | 2.47 | 3.27 | 8.9 | 2.54 | 4.15 | 3.04 | 2.47 | 1.78 | 1.19 |
| Standard Deviation | 11.2 | 13.3 | 12.6 | 18.3 | 33.2 | 9.5 | 19.0 | 14.6 | 24.0 | 16.9 | 23.0 |
| Median | 22 | 31 | 37 | 45 | 55 | 43 | 66 | 44 | 62 | 41 | 45 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

TABLE 2

*Distribution of Animal Protein Intake among Persons in the Survey
According to Age, Sex and Race **

| Animal Protein Intake Grams | Age in Years | | | | | | | | | | Total |
|--|--------------|------|------|-------|-------|-------|------|-------|-------|------|-------|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-20 | 21+ | 13-15 | 16-20 | 21+ | |
| | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | |
| | M-F † | M-F | M-F | M-F | M | M | M | F | F | F | |
| White | | | | | | | | | | | |
| <10 | 6 | 8 | 5 | 5 | 0 | 0 | 8 | 3 | 2 | 20 | 57 |
| 10- 19 | 12 | 9 | 16 | 12 | 2 | 4 | 26 | 9 | 9 | 71 | 170 |
| 20- 24 | 8 | 5 | 6 | 9 | 1 | 5 | 25 | 0 | 2 | 34 | 95 |
| 25- 29 | 5 | 4 | 6 | 5 | 3 | 6 | 21 | 3 | 2 | 19 | 74 |
| 30- 34 | 3 | 7 | 8 | 5 | 2 | 3 | 28 | 2 | 3 | 20 | 81 |
| 35- 39 | 1 | 4 | 7 | 6 | 0 | 4 | 19 | 2 | 4 | 14 | 61 |
| 40- 49 | 2 | 5 | 13 | 4 | 3 | 3 | 32 | 0 | 6 | 24 | 92 |
| 50- 59 | 3 | 3 | 2 | 2 | 5 | 3 | 23 | 0 | 1 | 13 | 55 |
| 60- 69 | 1 | 1 | 1 | 1 | 2 | 2 | 9 | 0 | 1 | 3 | 21 |
| 70- 79 | 0 | 1 | 2 | 1 | 1 | 4 | 14 | 0 | 1 | 2 | 26 |
| 80+ | 0 | 0 | 0 | 0 | 2 | 3 | 14 | 0 | 0 | 1 | 20 |
| Unknown | 0 | 1 | 0 | 1 | 0 | 3 | 9 | 0 | 2 | 8 | 24 |
| Total | 41 | 48 | 66 | 51 | 21 | 40 | 228 | 19 | 33 | 229 | 776 |
| Mean Intake | 24 | 28 | 30 | 27 | 47 | 42 | 40 | 19 | 31 | 26 | 32 |
| Standard Error of Mean | 2.32 | 2.47 | 1.97 | 2.16 | 4.67 | 3.64 | 1.42 | 2.36 | 3.03 | 1.04 | 0.69 |
| Standard Deviation | 14.8 | 17.0 | 16.0 | 15.3 | 21.4 | 22.1 | 21.0 | 10.3 | 16.9 | 15.5 | 19.2 |
| Median | 22 | 27 | 30 | 24 | 48 | 36 | 35 | 17 | 31 | 23 | 29 |
| Colored | | | | | | | | | | | |
| <10 | 17 | 10 | 13 | 14 | 3 | 4 | 19 | 1 | 4 | 25 | 110 |
| 10- 19 | 13 | 9 | 9 | 12 | 4 | 5 | 31 | 9 | 10 | 36 | 138 |
| 20- 24 | 3 | 2 | 3 | 1 | 0 | 2 | 8 | 1 | 3 | 8 | 31 |
| 25- 29 | 1 | 0 | 1 | 1 | 4 | 4 | 12 | 3 | 1 | 9 | 36 |
| 30- 34 | 0 | 1 | 0 | 2 | 1 | 3 | 7 | 0 | 4 | 5 | 23 |
| 35- 39 | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 0 | 0 | 3 | 10 |
| 40- 49 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 6 | 10 |
| 50- 59 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 1 | 2 | 9 |
| 60- 69 | 0 | 1 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 5 |
| 70- 79 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 80+ | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 |
| Unknown | 0 | 1 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 | 9 |
| Total | 34 | 24 | 26 | 31 | 15 | 22 | 98 | 15 | 24 | 96 | 385 |
| Mean Intake | 11 | 10 | 11 | 14 | 24 | 23 | 24 | 17 | 19 | 18 | 19 |
| Standard Error of Mean | 1.24 | 1.62 | 1.34 | 2.18 | 4.71 | 3.22 | 1.86 | 1.97 | 2.44 | 1.28 | 0.75 |
| Standard Deviation | 7.1 | 8.0 | 6.8 | 12.2 | 17.6 | 14.8 | 18.2 | 7.4 | 11.7 | 12.5 | 14.5 |
| Median | 11 | 10 | 10 | 11 | 20 | 24 | 19 | 15 | 18 | 16 | 16 |

* 25 Children under one year of age have been omitted
† M = Male; F = Female

gm.)* were more frequent in Negroes than whites, 59 and 32 per cent respectively. In white children under 13 low intakes were found in from 4 to 12 per cent. Ten, 13, and 9 per cent of white males 13 to 21+ in ascending age groups

had low intakes compared to 58, 24, and 44 per cent of white females respectively. Corresponding values for colored are 61 to 92 per cent in the children, 36, 24, and 27 per cent for the colored males and 85, 62, and 69 per cent respectively for the females. The smallness of some of the groups

* Approximately $\frac{2}{3}$ recommended allowance Food and Nutrition Board

may account for some of the fluctuation, but the pattern is obvious.

Similar deficiencies were found in respect to animal protein (Table 2) with again the colored showing a low intake (less than 20 gm.) more often than the whites (63.9 and 30.1 per cent respectively). Sex and age differences

were observed as for total protein. Intakes less than 20 gm. were recorded in from 31.8 to 36.1 per cent of the white children between 4 and 12, while among the white males the incidence was 9, 10, and 15 per cent in ascending age groups compared with 63, 35, and 41 per cent for white females of the

TABLE 3
Distribution of Total Serum Protein among Persons in the Survey
According to Age, Sex, and Race *

| Total Serum Protein Protein | Age in Years | | | | | | | | | | Total |
|--------------------------------------|---------------|-------------|-------------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-20 | 21+ | 13-15 | 16-20 | 21+ | |
| | Yrs. M-F † | Yrs. M-F | Yrs. M-F | Yrs. M-F | Yrs. M | Yrs. M | Yrs. M | Yrs. F | Yrs. F | Yrs. F | |
| Grams per 100 ml. | | | | | | | | | | | |
| White | | | | | | | | | | | |
| <3.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3.0- 3.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.0- 4.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 5.0- 5.99 | 2 | 0 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 7 | 16 |
| 6.0- 6.49 | 5 | 12 | 12 | 5 | 3 | 3 | 46 | 2 | 3 | 38 | 129 |
| 6.5- 6.99 | 12 | 11 | 26 | 20 | 8 | 14 | 89 | 6 | 10 | 74 | 270 |
| 7.0- 7.99 | 10 | 15 | 24 | 23 | 7 | 17 | 48 | 10 | 15 | 77 | 246 |
| 8.0- 8.99 | 1 | 3 | 1 | 1 | 0 | 0 | 4 | 1 | 0 | 7 | 18 |
| 9.0- 9.99 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 3 |
| 10.0-10.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11.0+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unknown | 10 | 7 | 3 | 1 | 2 | 6 | 35 | 0 | 5 | 24 | 93 |
| Total | 41 | 48 | 66 | 51 | 21 | 40 | 228 | 19 | 33 | 229 | 776 |
| Mean Value | 6.98 | 6.01 | 6.97 | 7.06 | 7.09 | 7.08 | 6.82 | 7.18 | 7.10 | 6.96 | 6.95 |
| Standard Error of Mean | 0.14 | 0.10 | 0.06 | 0.08 | 0.18 | 0.08 | 0.04 | 0.13 | 0.09 | 0.05 | 0.02 |
| Standard Deviation | 0.78 | 0.66 | 0.51 | 0.53 | 0.78 | 0.44 | 0.55 | 0.57 | 0.47 | 0.66 | 0.61 |
| Median | 6.85 | 6.89 | 6.88 | 6.98 | 6.96 | 7.00 | 6.75 | 7.15 | 7.07 | 6.88 | 6.86 |
| Colored | | | | | | | | | | | |
| <3.0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 3.0- 3.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4.0- 4.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5.0- 5.99 | 4 | 1 | 1 | 0 | 0 | 0 | 4 | 0 | 2 | 2 | 14 |
| 6.0- 6.49 | 4 | 2 | 3 | 2 | 1 | 1 | 19 | 2 | 5 | 16 | 55 |
| 6.5- 6.99 | 15 | 9 | 11 | 10 | 11 | 11 | 34 | 4 | 7 | 32 | 144 |
| 7.0- 7.99 | 7 | 9 | 9 | 17 | 2 | 8 | 34 | 9 | 9 | 37 | 141 |
| 8.0- 8.99 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 0 | 1 | 5 | 11 |
| 9.0- 9.99 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10.0-10.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11.0+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Unknown | 3 | 3 | 2 | 0 | 1 | 2 | 4 | 0 | 0 | 3 | 18 |
| Total | 34 | 24 | 26 | 31 | 15 | 22 | 98 | 15 | 24 | 96 | 385 |
| Mean Value | 6.78 | 6.96 | 6.92 | 7.24 | 6.82 | 7.03 | 6.92 | 7.13 | 6.90 | 6.98 | 6.96 |
| Standard Error of Mean | 0.14 | 0.12 | 0.11 | 0.09 | 0.11 | 0.09 | 0.06 | 0.13 | 0.15 | 0.08 | 0.03 |
| Standard Deviation | 0.78 | 0.57 | 0.54 | 0.53 | 0.42 | 0.42 | 0.61 | 0.50 | 0.72 | 0.78 | 0.43 |
| Median | 6.75 | 6.92 | 6.86 | 7.21 | 6.77 | 6.91 | 6.85 | 7.18 | 6.86 | 6.93 | 6.90 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

corresponding ages. A similar pattern but a greater frequency is found in the colored. The children 4 to 12 showed an intake of less than 20 gm. in 82.6 to 84.6 per cent, colored males, 50, 42, and 52 per cent in the ascending age groups, and colored females 71, 60, and 64 per

cent. Again some of the groups are rather small.

A history of edema was obtained from 49 white and 33 colored subjects. By far the greatest number were adult females (41 white and 20 colored) with only 5 white and 10 colored males, 21

TABLE 4

*Distribution of Serum Albumin Levels among Persons in the Survey
According to Age, Sex and Race **

| Serum Albumin Grams per 100 ml. | Age in Years | | | | | | | | | | Total |
|--|--------------|------|------|-------|-------|-------|------|-------|-------|------|-------|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-20 | 21+ | 13-15 | 16-20 | 21+ | |
| | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | Yrs. | |
| | M-F † | M-F | M-F | M-F | M | M | M | F | F | F | |
| White | | | | | | | | | | | |
| <2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2.0- 2.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 3.0- 3.49 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 6 | 11 |
| 3.5- 3.99 | 0 | 1 | 1 | 1 | 1 | 2 | 17 | 0 | 2 | 10 | 35 |
| 4.0- 4.24 | 0 | 4 | 3 | 4 | 3 | 5 | 11 | 3 | 0 | 25 | 58 |
| 4.25-4.49 | 7 | 4 | 5 | 9 | 1 | 2 | 38 | 4 | 6 | 32 | 108 |
| 4.5- 4.99 | 10 | 17 | 33 | 19 | 6 | 15 | 94 | 7 | 13 | 95 | 309 |
| 5.0- 5.49 | 10 | 10 | 19 | 13 | 6 | 9 | 26 | 4 | 7 | 33 | 137 |
| 5.5- 5.99 | 3 | 2 | 0 | 3 | 0 | 0 | 4 | 1 | 0 | 4 | 17 |
| 6.0- 6.99 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 |
| 7.0+ | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Unknown | 10 | 8 | 5 | 1 | 2 | 6 | 37 | 0 | 3 | 23 | 95 |
| Total | 41 | 48 | 66 | 51 | 21 | 40 | 228 | 19 | 33 | 229 | 776 |
| Mean Value | 4.98 | 4.81 | 4.83 | 4.86 | 4.80 | 4.67 | 4.63 | 4.73 | 4.32 | 4.42 | 4.70 |
| Standard Error of Mean | 0.09 | 0.09 | 0.04 | 0.08 | 0.20 | 0.09 | 0.03 | 0.10 | 0.16 | 0.07 | 0.02 |
| Standard Deviation | 0.51 | 0.57 | 0.35 | 0.58 | 0.87 | 0.50 | 0.45 | 0.46 | 0.80 | 0.63 | 0.51 |
| Median | 4.93 | 4.79 | 4.83 | 4.79 | 4.79 | 4.73 | 4.65 | 4.68 | 4.38 | 4.37 | 4.71 |
| Colored | | | | | | | | | | | |
| <2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2.0- 2.99 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 |
| 3.0- 3.49 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 3 | 5 |
| 3.5- 3.99 | 1 | 0 | 0 | 1 | 2 | 1 | 12 | 0 | 5 | 19 | 41 |
| 4.0- 4.24 | 5 | 2 | 4 | 4 | 3 | 3 | 17 | 2 | 3 | 15 | 58 |
| 4.25-4.49 | 5 | 2 | 3 | 2 | 4 | 5 | 18 | 3 | 4 | 18 | 64 |
| 4.5- 4.99 | 13 | 11 | 13 | 14 | 3 | 8 | 37 | 7 | 7 | 25 | 138 |
| 5.0- 5.49 | 5 | 5 | 4 | 9 | 2 | 2 | 8 | 3 | 1 | 7 | 46 |
| 5.5- 5.99 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 3 | 8 |
| 6.0- 6.99 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| 7.0+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| Unknown | 3 | 4 | 2 | 0 | 1 | 2 | 3 | 0 | 0 | 5 | 20 |
| Total | 34 | 24 | 26 | 31 | 15 | 22 | 98 | 15 | 24 | 96 | 385 |
| Mean Value | 4.73 | 4.78 | 4.68 | 4.81 | 4.44 | 4.61 | 4.47 | 4.69 | 4.32 | 4.42 | 4.53 |
| Standard Error of Mean | 0.10 | 0.08 | 0.07 | 0.08 | 0.13 | 0.10 | 0.05 | 0.10 | 0.16 | 0.07 | 0.03 |
| Standard Deviation | 0.54 | 0.35 | 0.35 | 0.44 | 0.47 | 0.46 | 0.50 | 0.37 | 0.80 | 0.63 | 0.55 |
| Median | 4.67 | 4.77 | 4.69 | 4.80 | 4.38 | 4.56 | 4.48 | 4.68 | 4.38 | 4.37 | 4.55 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

years and over, reporting this symptom. Only 3 colored children (7 to 15) and 3 white children (16 to 20) were included. Edema was found on the physical examination in 37 subjects, 25 white and 12 colored, or approximately 3 per cent of each group. However, again those with actual edema at the time of the examination were mostly women (19 white and 12 colored), with 6 white men making up the remainder. Furthermore, all but 1 were adults and

all but 6 were over 35 years old.

Only 5, or 10 per cent, of the white subjects, and 6, or 18 per cent, of the Negroes, who gave a *history* of edema actually had edema on examination. This is not surprising because the history included any previous time, while the examination disclosed the condition at the time of the examination only.

The serum protein values are shown in Tables 3, 4, and 5. Rather few ab-

TABLE 5
*Distribution of Serum Globulin Levels among Persons in the Survey
According to Age, Sex and Race **

| Serum Globulin | Age in Years | | | | | | | | | |
|------------------------|----------------|-------------|-------------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | 1-3 | 4-6 | 7-9 | 10-12 | 13-15 | 16-20 | 21+ | 13-15 | 16-20 | 21+ |
| | Yrs. M-F † | Yrs. M-F | Yrs. M-F | Yrs. M-F | Yrs. M | Yrs. M | Yrs. M | Yrs. F | Yrs. F | Yrs. F |
| | <i>White</i> | | | | | | | | | |
| <1.0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 |
| 1.0-1.49 | 4 | 3 | 8 | 3 | 1 | 2 | 9 | 0 | 1 | 7 |
| 1.5-1.99 | 10 | 12 | 17 | 10 | 5 | 7 | 66 | 6 | 6 | 54 |
| 2.0-2.49 | 10 | 14 | 26 | 26 | 8 | 18 | 79 | 8 | 8 | 82 |
| 2.5-2.99 | 3 | 7 | 9 | 10 | 3 | 4 | 23 | 2 | 8 | 37 |
| 3.0-3.49 | 1 | 3 | 1 | 1 | 1 | 2 | 6 | 1 | 1 | 18 |
| 3.5-3.99 | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 0 | 3 | 3 |
| 4.0-4.99 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 1 |
| 5.0+ | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Unknown | 11 | 8 | 5 | 1 | 2 | 5 | 39 | 0 | 5 | 25 |
| Total | 41 | 48 | 66 | 51 | 21 | 40 | 228 | 19 | 33 | 229 |
| Mean Value | 2.06 | 2.15 | 2.07 | 2.21 | 2.28 | 2.34 | 2.16 | 2.44 | 2.39 | 2.30 |
| Standard Error of Mean | 0.13 | 0.09 | 0.06 | 0.06 | 0.13 | 0.13 | 0.04 | 0.19 | 0.14 | 0.04 |
| Standard Deviation | 0.70 | 0.56 | 0.47 | 0.42 | 0.59 | 0.74 | 0.54 | 0.84 | 0.72 | 0.59 |
| Median | 2.00 | 2.14 | 2.11 | 2.23 | 2.22 | 2.24 | 2.12 | 2.22 | 2.38 | 2.24 |
| | <i>Colored</i> | | | | | | | | | |
| <1.0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |
| 1.0-1.49 | 3 | 1 | 1 | 1 | 0 | 1 | 4 | 0 | 1 | 2 |
| 1.5-1.99 | 11 | 7 | 5 | 2 | 3 | 3 | 12 | 2 | 4 | 14 |
| 2.0-2.49 | 10 | 8 | 11 | 15 | 5 | 7 | 41 | 7 | 7 | 31 |
| 2.5-2.99 | 6 | 3 | 5 | 8 | 6 | 5 | 23 | 5 | 8 | 17 |
| 3.0-3.49 | 0 | 1 | 0 | 3 | 0 | 3 | 11 | 1 | 3 | 21 |
| 3.5-3.99 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | 0 | 1 | 3 |
| 4.0-4.99 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5.0+ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Unknown | 3 | 4 | 3 | 0 | 1 | 2 | 4 | 0 | 0 | 6 |
| Total | 34 | 24 | 26 | 31 | 15 | 22 | 98 | 15 | 24 | 96 |
| Mean Value | 2.12 | 2.15 | 2.27 | 2.53 | 2.36 | 2.33 | 2.43 | 2.42 | 2.48 | 2.56 |
| Standard Error of Mean | 0.10 | 0.13 | 0.12 | 0.11 | 0.11 | 0.14 | 0.06 | 0.11 | 0.12 | 0.07 |
| Standard Deviation | 0.54 | 0.49 | 0.60 | 0.60 | 0.40 | 0.62 | 0.54 | 0.41 | 0.59 | 0.69 |
| Median | 2.08 | 2.13 | 2.25 | 2.42 | 2.40 | 2.36 | 2.38 | 2.40 | 2.50 | 2.47 |

* 25 Children under one year of age have been omitted

† M = Male; F = Female

normally low total serum proteins were found (32, or 3 per cent, in the entire group were below 6 gm. per 100 ml.), occurring in about 3 to 4 per cent of the various age and sex groups, except for white and colored children age 1 to 3 and colored girls 16 to 20 in whom it was 6.4, 12.9, and 8.3 per cent respectively (Table 3). However, serum *albumin* levels were below normal in a considerably larger number (Table 4). In 95, or 9 per cent of the entire group, the albumin was less than 4.0 gm. per 100 ml. These low values were more frequent in the colored than in the white subjects (13.1 and 6.9 per cent respectively), and the various age and sex groups showed rather striking differences. Serum albumin concentrations below 4 gm. per 100 ml. were not found or were infrequent in white and colored children below 13 years of age. The highest incidence was found in the colored girls 16 to 20 (29 per cent) and colored women 21+ (24 per cent). White females of the same age groups show 10 and 8 per cent respectively. An incidence of 5 to 14 per cent occurred in the white and colored males 13 to 15, 16 to 20, and 21+. In some of the groups the total numbers are somewhat small and in some the number of "unknown" is relatively quite large. In addition to those with clearly abnormally low values another considerable number had values at the border line (4.0 to 4.24 gm. per 100 ml.). The mean serum protein values however, were clearly in the normal range.

The distribution of serum globulin values is given in Table 5. Values less than 1 gm. per 100 ml. may well be errors. Concentration above 3 gm. per 100 ml. were found twice as frequently in the colored as in the whites.

DISCUSSION

These data show an intake of total protein below the recommended allow-

ance of the Food and Nutrition Board* in a very considerable number of the subjects, with many below the generally accepted minimum for satisfactory protein nutrition under usual dietary conditions. Moreover, comparison with the mean total calories of these subjects suggests that the deficiency is greater than first appears. As is well known, the adequacy of the protein intake depends to a large extent on the total calories. In adults especially, rather low intakes of protein are adequate to maintain nitrogen balance, preserve nitrogen stores, and provide for adequate protein nutrition if a large calorie intake from other sources supplies all energy needs and protects protein from being burned as fuel. This assumes of course that unusual demands for protein do not exist (growth, disease, lactation, etc.). Furthermore, much of such minimal amounts of protein must be of high biologic value (animal protein). Neither condition is fulfilled in this instance. Deficiencies are found in the intake of calories, in the absolute sense as well as relative to the protein intake, and the intake of animal protein is low (less than 20 gm.) in a very considerable proportion of the subjects. As might be expected, the protein intake showed a close and direct relation to total calorie intake.

In spite of the apparently severe restrictions in the intake of protein, the number of subjects with abnormally low serum proteins is not very great. While a hypoalbuminemia in 9 per cent of the total population is significant and important, and an incidence of 15 to 30 per cent in certain age groups even more impressive, the serum protein values fail to reflect as great a deficiency of protein as appears from the dietary studies. This lack of correspondence is further shown by a failure to demonstrate any correlation be-

* National Research Council

tween the serum albumin levels and such factors as the total caloric intake, total protein intake, and animal protein intake.

Attention should be called to the different significance of total serum protein and serum albumin. Abnormally low albumins were found three times as often as abnormally low total protein. Total serum protein is the sum of the albumin and globulin fractions. Globulin is relatively much less affected by nutritional deficiencies than is albumin, but on the other hand, is more affected by such factors as infections, etc. Both globulin and albumin fractions have a *range* of normal concentration over which they vary but not necessarily in the same direction. Total protein likewise has a *range* of normal concentration. It is, therefore, possible to have an *abnormally low* albumin combined with a rather *high normal* globulin to give a normal total protein. This occurs rather frequently in mild nutritional hypoproteinemia, which makes it important to determine the protein fractions as well as total protein. In this survey 89 per cent of the instances of hypoalbuminemia were accompanied by *normal* total serum proteins. Had not protein fractions been determined these instances of hypoproteinemia (hypoalbuminemia) would have been missed. Because of this and because serum albumin more adequately reflects protein nutrition it can serve alone for the serum protein values in such surveys of nutrition.

There probably are several explanations for the failure to find a correlation between the serum protein (albumin) and relative and absolute intakes of protein. Serum protein values are not solely a function of protein intake, at least in the direction of greater concentrations. Serum albumin values tend to fall within a narrow normal range which is relatively unaffected by any except rather extensive variation

in protein intake. This together with the inability to "break down" the values to a finer range and the relatively gross error in determinations of intake make it difficult to establish a close and direct correlation. Furthermore, serum protein values are subject to temporary variation having nothing to do with protein in the diet, the changes being sufficiently great to obscure any correlation within the range of usual normal values. Finally there is the matter of border line values and the protein reserve. Large numbers of the subjects had serum protein values close to the lower normal levels. In the absence of extra demands, normal or near normal levels may be maintained on rather small daily intakes of protein. Thus an appearance of normality is given. This constitutes however a reservoir of protein deficiency in a population, which becomes manifest under conditions of extra demand. Many of our subjects have customarily taken such a diet as is recorded here for years and their protein reserves often have been exhausted if one can judge from observations made in situations which make demands on the reserve, i. e., when they are ill.

It may of course be questioned whether the serum protein concentration is to be taken as an index of protein nutrition. If it is not, the lack of correlation between serum protein values and protein intake and the failure of the serum protein values to reflect to a greater degree the deficiency of intake would be well explained. It is well known that serum protein formation is affected by other factors. However, there is clear evidence experimentally at least, of a close relation between the dietary protein intake and the serum proteins. With severe restrictions the effect is manifest in the mass hypoproteinemia of populations (epidemic nutritional edema). In less severe and more chronic deficiencies

the factors of protein storage and the influence of other factors than protein deficiency must be considered in the interpretation of the data. If one may judge from clinical experience and the effects of more restricted dietaries on populations, a hypoproteinemia and especially a hypoalbuminemia may be taken as *prima facie* evidence of protein deficiency in studies of the nutrition of populations.

If this is true, the relation between the serum proteins and the history of edema and its actual presence on examination is important. Since this edema may be a result of hypoproteinemia and hence presumably an expression of protein deficiency, a rather close correspondence between edema and serum protein concentrations might be expected. As a matter of fact there was little relationship between the two. Only 12 of the 88 persons with a history of edema, 6 white and 6 colored, had serum albumin concentrations below the normal level (4 gm. per 100 ml.). Of the 37 subjects with actual edema at the time of examination only 5 had abnormally low serum albumin or total protein (in one the albumin concentration is unknown). On the other hand, of the 95 persons with hypoalbuminemia only 11 had edema or a significant history of edema.

There are, however, excellent reasons for this failure of correlation other than a lack of significant relation between the serum protein concentration and protein nutrition. First, the lack of agreement between the concentration of serum albumin and a history of edema is of no significance. Such histories are relatively unreliable, and the period of the edema may have had no relation to the time when the serum protein concentration was determined. Second, there are other causes for edema than lowered serum proteins and these must be eliminated before edema can be ascribed solely to a hypoalbuminemia.

Fortunately the methods used in the survey make it possible to detect such other causes of edema. Analysis of the 37 subjects with edema shows that of the 32 with normal serum proteins (albumin) all but 6 had a possible cause for the edema other than hypoalbuminemia, namely heart disease, including hypertension, renal disease, varicose veins, advanced age, etc. One of the 6 without such a possible cause had a concentration of total serum proteins barely within the normal range.

Finally, the failure of some with low serum proteins (albumin) to exhibit edema must be interpreted with due regard to the mechanism of the formation of edema in such cases. Although hypoproteinemia is the principal underlying cause for the edema, there are secondary factors which influence greatly the development of the edema and at certain concentrations of the serum proteins may determine whether edema will or will not occur (appear) and to what degree. Posture, tissue pressure, environmental temperature, and salt and water intake are such factors and at only slightly deficient concentrations of serum proteins in particular they may determine at a given time and in a given subject whether edema will occur or not. Certain of these factors operate in both directions. An increased water intake, for example, may precipitate edema at a level of plasma proteins which would otherwise not cause edema, while dehydration may prevent edema with proteins more severely subnormal. Analysis of the cases with hypoalbuminemia shows that in 85 of the 95 the concentration of albumin was only slightly below normal and was combined with a high normal (or in some instances an abnormally high globulin) to give a normal total protein. Calculation of the osmotic pressure in these cases.⁸ shows that in most of them the colloid osmotic pressure was sufficiently high to

make the occurrence of edema unlikely. Therefore, although the hypoalbuminemia indicates a deficient protein nutrition it was not sufficient in many of the subjects to cause an edema under the circumstances existing at the time of the examination.

In general then it may be concluded that the presence of edema on physical examination, while it may indicate a hypoproteinemia and hence a state of protein deficiency, cannot be accepted as such in the assessment of nutrition of populations unless other possible or likely causes of edema are excluded. On the other hand, a hypoalbuminemia of moderate to slight degree may not result in and may not be revealed by edema in a considerable proportion of the subjects.

SUMMARY

The results of a survey of the nutrition of some 1,200 persons in a general rural population in middle Tennessee with respect to protein nutrition (dietary intake, physical examination, and serum proteins) are reported. Frequent and severe deficiencies in the intake of protein, greater in the Negroes, the females, and certain age groups were observed. There was a significant incidence of protein deficiency as manifested by a hypoalbuminemia (about 10 per cent in the entire population), but it was not as great as might have

been expected on the basis of the dietary intake records. However, in some groups, notably colored females 16 and over, the incidence of hypoalbuminemia was very high, 24 to 29 per cent.

Edema was found on examination in a small number (about 3 per cent) but was often explainable by causes other than hypoproteinemia. No correlation was obtained between the dietary intake of calories or protein and the serum proteins. The significance of the results is discussed.

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Field Experience for Health Education Personnel*

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A LARGE part of the effort put into health education is spent in mass processes such as news releases, lectures, broadcasts, printed material, exhibits, and posters. While these are all important from the point of view of keeping the public informed and health conscious, large-scale changes in behavior do not follow. The best opportunities are provided when we find small groups of individuals brought together by a single purpose. Adequately conducted discussions with these small groups will uncover the past experiences which are the foundations of their opinions and prejudices. They will provide opportunities for the discussion of controversial issues and allow for presentation of factual material by class or educator. They should help the individual think his problems through, and influence him to act in such a manner that his health and the health of the community will be improved.

In many communities all of the official and voluntary health agencies, various men's and women's clubs, and organized groups such as labor unions are forming health councils so they will be better prepared and able to care for the health and welfare needs of the community. They realize that any program of health education must be planned around a study of the needs

of the people and through these health councils, group needs may be considered. Health educators then can meet small homogeneous groups in their immediate neighborhoods. Through these health educators the desires of individuals may be presented to the health council for consideration, and community needs interpreted to the neighborhood groups.

Preparation of health educators must be given thoughtful consideration and critical analysis because of the great need to influence and mold public opinion at this time and the opportunities offered for preparing people to take part in planning community programs. Most schools and universities provide some courses which introduce the students to materials and methods in health education. They are designed to give health educators a working knowledge of available material.

In some of the courses a study is made of methods of presentation to different age, racial, or nationality groups; the development of some criteria for evaluating health information and materials; and consideration of measures for judging the results of health teaching. Sometimes these courses or allied courses cover more in detail methods of conducting group discussions; talks are planned and practice is experienced within the group. There is little opportunity, however, for field experience under supervision.

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It was in response to this need that the Detroit Department of Health agreed to cooperate with Wayne University to provide the necessary field experience, training, and supervision. The Director of Public Health Nursing at Wayne University, and the Director of Nursing, and the Director of Health Education for the Department of Health planned the program. The course in Materials and Methods given at Wayne University is essentially the same as the methods course described above. This is a prerequisite to the course in field observation and practice teaching which will now be described.

The objectives for the field course are:

1. To acquire understanding and skill in handling group discussions effectively
2. To organize a teaching unit that will be use
3. To achieve ability to plan objectives for different learning situations and to understand what activities will tend to produce said objectives
4. To understand the needs of each group as well as the individuals in the group and to suit material to needs
5. To gain confidence in one's own ability to teach through practice in teaching under guidance
6. To gain knowledge of how to find, evaluate, and use factual material

The term educator as used here will mean the nurse, teacher, or community leader who is taking the course in preparation for teaching. The individuals this educator expects to have in future classes will be called students.

The course consists of eight 2 hour meetings with the instructor, four observations of group discussions conducted by qualified persons, writing of six discussion plans which are analyzed and corrected by the instructor, and finally conducting group discussions under supervision using these plans as a guide.

During the eight 2 hour meetings, the educators select a unit of learning. The expression "unit" implies whole-

ness or unity. It should present a unified experience which will give the student an understanding and control of a type of life situation. Each unit is broken down into as many separate parts as necessary for each to be easily understood and for all phases of the problem to be presented for discussion during the discussion period. Each part however should be a whole or total experience.

The educator, for example, may select for a unit of learning "Maternal Health." The parts could be:

First Discussion: How a baby develops in utero

Second Discussion: Why the expectant mother should see the doctor early in pregnancy

Third Discussion: Food needs of the expectant mother

Fourth Discussion: Healthful living during pregnancy

Fifth Discussion: What to do if the baby arrives early

Sixth Discussion: After the baby comes

After the educator has selected the unit of work, she will have to plan the objectives. There will be overall or central objectives for each unit and immediate or contributory objectives for each meeting. The objectives depend upon the needs, interests, and previous experiences of the students. The objectives are achieved if the discussions give the students knowledge, skills, abilities, or understanding to help them solve their problems. The educator may formulate objectives according to a student's needs, but they must be the result of some expression of desire on the part of the student and as such acceptable to her.

The educator should have a discussion plan prepared for each meeting. This is to help the educator ascertain if all the material is covered in the best possible manner and if it is going to meet the needs of the group. The discussion should be headed by the im-

mediate objectives. The body of the plan consists of subject matter, questions, and activities. All factual material should be included under subject matter. Statements should be briefly and simply stated so the educator may refresh her memory by a glance at the plan. Thought should be given to the type of questions to be asked to stimulate the desired response. They should promote thinking, provoke discussion, and at the same time bring out the theme of the lesson. The student must do certain things to bring about a change in behavior. These things we call activities. Problems and activities should challenge the student. They may consist of such learning experience as listening, enjoying, writing, reading, discussing, demonstrating, interviewing, going on excursions, or reporting. Because of activities the student gains a greater knowledge of the topic under discussion. They also should help her to develop some skill or ability to use her knowledge.

A great deal of material has to be covered to give the educator the background of facts and figures she will want and need. Each educator makes a bibliography of all the references used in preparation of the unit, giving title, author, publisher, date of publication, and pages. Knowledge of author helps to evaluate the material and a complete bibliography will be an aid when there is need to check a statement or when challenged for authenticity.

The work put into the discussion plans is for the purpose of achieving certain objectives. Evaluation and accomplishment can be determined to some extent by examinations, review, return demonstrations, and especially by new or changed attitudes as noted in discussion or practised by the group.

The eight class meetings then should help the educator conduct good group discussions by making her familiar with the following:

- Selection of a unit
- Suitable objectives
- Helpful procedures
- Reliable references
- Evaluation of results

Practice teaching is usually done in the clinics or in a community center where the group has already been organized by an experienced person. The educators teach six classes under supervision. Every class is not supervised, but as many as necessary to evaluate her ability. The director or supervisor of the center where the educator is to teach is familiar with the course content and objectives and she usually observes the first two lessons. She does this to help the educator orientate herself, to familiarize her with the program of the center, and especially to give her an understanding of the people, their needs and problems. The supervisor does not criticise methods of teaching or lesson content. In this way the educator will have time to gain poise and confidence before she is observed by those who may be more critical of her methods.

Usually the other four lessons are supervised by the course instructor. The director of public health nursing may observe or the director of health education for the department of health. If the classes deal with a special subject such as maternal or child health the director of child welfare may supervise some classes. Most of the courses already planned and carried out have contained one lesson on nutrition and the head of that division observes when that discussion is held.

Consideration is given not only to how the educator conducts the class but to the surroundings: Where is the class held? Have arrangements been made for some privacy? What visual material is used in form of posters and printed material? Will there be freedom from interruptions? In other words, does the environment

have an air of welcome and comfort that will encourage informal discussion? These features are discussed with the educator before or after class because they should have been a part of her preparation.

The educators have a number of books and pamphlets available at each meeting with which the class members can become familiar and which they can order if they desire. When enough copies are available some of the class members take a book home and make a report at a future meeting. References are selected with the intelligence, abilities, and needs of the group in mind.

Educators prepared with this practical experience will have a better appreciation of the basic needs and wants of individuals. Understanding these needs they will be better able to conduct discussions which will bring forth individual problems. Individual problems are usually interrelated and in turn closely connected with community health problems. When persons realize this they are more willing to work together for the good of all. This is a valuable contribution to the total community health program.

Educators will have some experience in applying the essentials and principles expounded by Overstreet,¹ Mueller,² Bryson,³ and Nash.⁴ Just as

it is necessary to know the basic needs and wants of individuals, so it is important to know when they are most receptive to suggestions and will more readily translate these suggestions into action. Nash in *Teachable Moments*, says, "The objective of all teaching regarding a subject is doing something about it. Information may be translated into behavior more easily when an individual has the power and the opportunity to act in behalf of himself or his family. The guidance must come from experts."

Teaching six lessons will not make an expert of these educators, but it will provide them with some technics which will be most helpful and practice will help to perfect these.

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Dehydration Procedures and Their Effect on Vitamin Retention*

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THE term "dehydration," by strict definition, means the removal of water, regardless of the method applied. At the present time, according to general usage, the term is applied to processes by which the normal content of water in foods is reduced to approximately 5 per cent. At such low concentrations of water, foods will generally keep over considerable periods of time. This fact has been known from time immemorial, and as far back as written records go references are found of the preservation of dates, figs, and other fruits solely by sun drying. Our Western Indians and those in southern South America preserved meats by an air drying process. The flavor and texture of meats so preserved would not appeal to a connoisseur, but they did provide their users with an easily portable form of animal protein and one which could be preserved for extensive periods of time. It seems probable that few if any of the vegetables could be satisfactorily preserved solely by sun or air drying, since, in general, they would decompose before the moisture was reduced to a point where such decomposition could not take place.

In the making of both butter and cheese, the moisture content of milk is

reduced and the preservation of these products can be attributed, at least in part, to dehydration. Except for the Chinese method of keeping eggs by the use of lime, our older methods of egg preservation, such as they were, did not involve dehydration as an important factor. In more recent years, however, whole eggs, egg white, and egg yolk have been preserved by dehydration, and a large-scale industry is now in existence.

Many conditions brought about by the war have forced the application of dehydration as a method of preservation. The primary advantages of such a method are many. In the first place, weight can be reduced by approximately 90 per cent in the case of vegetables and by about 70 per cent in the case of most of the other foods. Without using compression on the dried products, the volume reduction of the dried product, as compared with the raw product, is not as great as the weight reduction, but it is still sufficiently large to warrant dehydration. If compression is used, much larger reductions in space can be obtained. Just how to obtain the compression of many products without injuring their quality is not yet known, but as an example of the possibilities, I might say that I have recently seen 5 lbs. of dried vegetables in a No. 10 can. Assuming a 10 to 1 drying ratio, this is equivalent to approximately 50 lbs. of the fresh vegetables, or roughly, one bushel. The

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packaging of dehydrated foods permits either the use of much smaller amounts of metal, if cans are to be used, or the possible elimination of metal containers and the substitution therefor of various combinations of sheets of glassine, cellophane, kraft or other papers, and possibly other plastic materials not yet in production.

As in the case of canning and quick-freezing, if a really high grade product is to be obtained, the manufacturer must go all the way back to the field where the crops are produced. The selection of varieties for a given area, which will dehydrate satisfactorily, is important. Harvesting obviously must be done at a predetermined stage of maturity. Once harvested, delays in all operations must be reduced to a minimum, although for root crops, such as potatoes, carrots, and beets, this speed is not so essential as it is for spinach, string beans, corn, and peas. Even in the case of the root crops, however, there is a limit to the period during which they should be held in storage.

On arrival at the dehydration plant, the products to be dried must be given essentially the same preparation as for canning or quick-freezing. These operations include washing, sorting, grading, peeling, coring, cutting or slicing and, finally, blanching. After these necessary operations have been completed, the actual drying is begun. Any one of a large number of methods can be used for the dehydration, but most frequently either tunnels or cabinets are used.

The drying operation is carried out until the moisture is reduced to the amounts permitted by the various specifications applicable to a given material. Having reached this stage of drying, the product is ready to be packaged.

If the whole operation of the production of dehydrated foods is consid-

ered as 100, this total is made up of preparation, 40; drying, 20; and packaging, 40. Expressed in another way, the preparation of the raw product and the maintenance of the qualities of the finished products are of about equal importance, and each is considerably more important than the actual method of dehydration used.

I have made brief reference to the several preliminary preparation operations. With the possible exception of blanching, the terms used, I believe, are self-explanatory. The operation of blanching consists of heating the raw product by immersion in hot water, by steam or by other methods, as may be necessary. The purpose of the blanching is to inactivate the enzyme system present, to set or hold the original colors in many cases, and to facilitate both dehydration and rehydration. There has probably been more discussion over the most suitable method of blanching than over any other operation. Experimental work carried on in the Bureau of Agricultural Chemistry and Engineering has shown that there is much less loss of ascorbic acid where steam is used for blanching than when hot water is used. The respective percentages of losses with these two treatments are as follows:

| | <i>Steam Blanching</i> Per cent | <i>Water Blanching</i> Per cent |
|----------|------------------------------------|------------------------------------|
| Kale | 19 | 23 |
| Beets | 14 | 36 |
| Potatoes | 22 | 37 |
| Cabbage | 14 | 51 |

It has been suggested that by using the same water for blanching over and over again, only maintaining a fixed density, these losses might be reduced. Experimentally, our investigators have found that this is not the case.

To blanch satisfactorily with steam, it is essential to have sufficient steam to raise the temperature of the product to approximately 190° in about 1½ minutes, and it is rarely necessary to

extend the blanching time for more than 5 or 6 minutes. Ideally, the blanching should follow immediately after the other preliminary treatments, but where this is impossible, losses of ascorbic acid can be reduced by holding the unblanched material in a dilute salt solution. This practice, however, is not recommended and is condoned only under abnormal conditions which obviously will occur from time to time in any factory.

The following figures, based upon a number of determinations, indicate the vitamin C losses which occur as a result of steam blanching:

| | <i>Per cent Losses</i> |
|----------------|------------------------|
| Beets | 14.8 |
| Cabbage | 18.3 |
| Carrots | 35.8 |
| Kale | 19.7 |
| Mustard Greens | 24.1 |
| White Potatoes | 22.5 |

Raw products from other sources than those used and other blanching methods will probably produce somewhat diverse figures, but these can safely be taken as a guide to average practices.

Without discounting at all the importance of the vitamin requirements of the human body, I might say that our experimental work has been directed toward the production of palatable, attractive foods and that the edibility of the product has been the main criterion of the success of our methods. Existing specifications do not call for any definite vitamin content of the dehydrated products. Because there are such wide variations in the vitamin content of the raw products, specifications based upon the known averages would be impractical. As an example of this, I might cite a case which occurred in our investigational work where spinach from two adjacent fields showed, respectively, 3 and 100 mg. of ascorbic acid per 100 gm. At the present time we are unable to give any

reason for this enormous variation. In another case, a lot of cabbage purchased for experimental drying was found to have practically no measurable content of ascorbic acid, although the general appearance of the cabbage was excellent and there was no reason to believe that the product had been subjected to any unusual or abnormal storage or other treatment.

I might say that our experimental work was undertaken to develop dehydration methods applicable to the foods in which the armed forces were particularly interested. These consisted of white potatoes, sweet potatoes, cabbage, carrots, onions, beets, and rutabagas. It will be noted that, with the exception of carrots and beets, none of these products is ordinarily canned and of the total production of beets and carrots, only a comparatively small proportion is canned under normal conditions.

I have called attention to the fact that the methods of dehydration are of less importance than the other fundamental factors incident to the production of dehydrated foods. I have also stated that the commonly used dehydration equipment is either the tunnel or the cabinet. I think that you may be interested in knowing more regarding the actual dehydration equipment.

The simplest form of dehydrator is the cabinet. This consists of a box-like room in which it is possible to control temperature, relative humidity, air volume, and air velocity. The properly prepared material is placed upon trays at a loading rate not to exceed $1\frac{1}{2}$ lbs. per sq. ft. Generally, the trays are stacked one above the other on a truck, and the truck pushed into the cabinet. After the doors are closed, the fans are turned on and the air current forced through steam radiators. When the operation first begins, quite high temperatures can be maintained on both wet and dry bulb thermom-

eters, for while in the wet condition, the product cannot be overheated and if the difference between the wet and dry bulb thermometers is not too great, hardening of the surface of the drying material will not occur. As the operation continues and the moisture is removed, it is necessary to reduce the temperatures quite a considerable degree. For each product there is a critical temperature which must not be exceeded when the product is dry. The critical temperatures run from about 135° to as high as 165° F. for most vegetables. The cabinet drier is not an efficient drying machine, but it has the virtue of being flexible though it must be operated on a batch cycle. It is not, therefore, essential to keep the factory operating 24 hours a day with all the disadvantages, particularly of obtaining labor, that such a type of operation entails.

For larger scale and continuous operations, the tunnel type drier is generally used. This is essentially an extension of the cabinet type in that, instead of one or two trucks each bearing 25 trays, there is sufficient length for 10 to perhaps 15 trucks. The same necessity exists for the control of temperature, relative humidity, air velocity, and air volume. Three types of tunnels are in use. They are known, respectively, as the parallel flow, the counterflow, and the center exhaust tunnels. In the first type, the hot air and the wet product enter at the same end of the tunnel; in the second case, the hottest, driest air meets the dried product coming out of the tunnel; and in the third, hot air, although at different temperatures, is introduced at both ends of the tunnel and is taken out in the center. There are advantages in both the parallel and counterflow types, and those advantages are used in the center exhaust type. Our engineers, and many of the other engineers in this field of activity, believe

that the center exhaust type is the most satisfactory, both as to its efficiency and the quality of the products obtained.

There have been introduced recently, but not yet given thorough trials, a number of other types of driers. Among these I might mention the continuous belt type for which large production capacity is claimed. A number of vacuum driers have been invented and a few seem to have merit, although in all cases the amount of metal required is large. For milk and eggs, the spray type of drier is the conventional one. In this operation, the liquid (after some condensation in the case of milk) is sprayed in at the top of a tall chamber and there meets a rising column of warm or hot air. By virtue of the rapid evaporation, the temperature of the product is not raised, although by the time it reaches the bottom of the chamber practically all of the moisture has been removed. Such a process, obviously, will produce only a powdery output. The various types of heated drums can be used for drying liquids. For some purposes they are quite satisfactory, but in all cases the dried product has no definite shape.

I believe it is rather obvious that any method of food preservation necessarily results in the loss of some of the original vitamin content. Our experimental work has extended into the field of packaging and storage. We have found that the vitamin losses in storage may be equal to, or even larger than, those incident to the preparation and dehydration of the various products. Part of the losses in storage are due to the effect of oxygen and part to the effect of moisture. We are definitely sure that there is a close relation between the amount of moisture in the product and the rate of vitamin destruction and the development of abnormal colors and flavors. Present specifications for dehydrated vegetables

permit from 4 to 6 per cent of moisture, except in the case of riced or pre-cooked potatoes where a 7 per cent moisture content is permitted. We have many indications that with lower moisture contents than those now provided, storage life may be extended, and it is more than probable that the existing specifications will be changed in this regard.

The necessity of keeping dehydrated products dry brings us to the question of packaging. The standard tin can probably represents the ideal package. This can be varied in size to meet the needs of the household or the needs of the mess cook who prepares food for standard units of around 100 men. Under normal conditions we would look no further than a tin can for a satisfactory package. However, these are not normal conditions. You, of course, know that only about $1\frac{1}{2}$ per cent of the "tin can" is tin, the rest being sheet steel. We have now more demands for steel than our mills can supply and, so far as possible, attempts are being made to use materials other than steel for food packaging.

Dehydrated foods can be packaged in non-metallic containers, since they are not subjected to the conditions which in a cannery require the use either of tin cans or glass containers.

The ideal package for dehydrated products must be moisture-proof, moisture-vapor-proof, insect-proof, and rodent-proof. The first two conditions can be fairly well obtained, and the third can be approximated by the use of certain non-metallic packages. As far as rodents are concerned, something other than the package itself must be used to give the necessary protection.

Some idea of the magnitude of the problem may be obtained by considering the conditions under which army supplies may be stored. These range from temperatures in the interior of Russia and Alaska of perhaps 40° be-

low zero to those of the Sahara Desert, and with humidities ranging from practically zero to 100 per cent saturation. A large amount of experimental work is going on not only in our laboratories, but elsewhere, to determine what packages can be obtained or devised that will adequately protect their contents under such wide ranges of conditions.

It has been noted that there is a close relation between deterioration and moisture content. If we start with a dehydrated food of 5 per cent moisture content, we believe that the product will be usable for one year if not more than 2 per cent moisture is added during the storage period. This gives us a fundamental requirement of the package in terms of water-vapor transmission. It is not safe to say that because a fresh sheet of packaging material transmits moisture at a low rate, a bag or package made from this same material will have the same water-vapor transmission characteristics. This fact is frequently overlooked in comparing packaging materials.

Since the subject of my talk deals with vitamins, I suppose I should not bring into the discussion the matter of rancidity. This, however, is so important in connection with many, if not most, of the dehydrated foods that I shall discuss it to some extent. Rancidity has undoubtedly limited the production and use of dried whole milk. It is for this reason that practically all of the dried milk used is made from skim milk. Obviously, in the case of meat, and particularly pork, the possibility of rancidity development during the period between dehydration and use cannot be neglected. Just how great this danger is, we cannot say at the present time. It seems probable that eventually antioxidants must be used in order to hold the product in an edible condition for the time required. Rather unexpectedly we have found that the

development of rancidity is not an unusual occurrence in dehydrated vegetables. Ordinarily, we do not consider fat as an important constituent of vegetables, and this is quite correct, as rarely if ever does the fat content exceed 0.2 per cent. In the fresh vegetable, however, this is accompanied by some 85 per cent of moisture. When the moisture is reduced to 5 per cent, necessarily the percentage of fat increases inversely and many of the abnormal odors in dehydrated vegetables have been found to be confined to the ether extract and are organoleptically identical with the odors associated with normal fat rancidity.

E. M. Chace, of the Bureau of Agricultural Chemistry and Engineering, summarized the results of our vitamin and other investigations at the June meeting of the Institute of Food Technologists at Minneapolis. This summary, ACE-172, "The Present Status of Food Dehydration in the United States," has been mimeographed and is available upon request either to the Bureau in Washington or to Mr. Chace at the Western Regional Research Laboratory, Albany, Calif. I have refrained from giving a mass of statistical and other information regarding the fate of vitamins in dehydration because the work was already well presented in this summary.

In summation, I feel that as far as dehydration is concerned, accent must be put upon the word "food"; and I think of food as something attractive

in appearance, color, flavor, and texture. It is something that a hungry man will eat and with which he will be satisfied. It is the job of the technician to produce foods which meet with these standards and at the same time to maintain, as far as possible, the vitamins, minerals, and other elements present in the raw products. To do this, he must operate at the highest possible speed, use the best known methods, and protect the product as well as he can with the packaging material available. No method of preservation will hold all of the desirable qualities of the fresh, raw product.

No matter how well the technologist does his job, there is no guarantee that vitamins, minerals, and other food elements will not be lost or wasted in the kitchens. In so far as the military uses are concerned, I hope, in fact I believe, that the cooks will be so instructed and supervised that the consumers will get all that is practically possible in the foods set before them. If it shall be found that the vitamin supplies are inadequate when dependence is placed upon the foods available, other methods of providing necessary vitamins are, and will be, available. It is our belief that properly prepared dehydrated foods will compare favorably with any others which might be available under the exigencies of military operations and possibly even with many of the so-called fresh products which are available to the housewife through the retail stores.

Losses of Vitamins Which May Occur during the Storage of Dehydrated Vegetables^{*†‡}

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WHILE it is of great importance to produce dehydrated vegetables without marked loss of vitamins during preparation and dehydration, it is equally important to prevent considerable losses during the period between dehydration and consumption. During World War I millions of pounds of vegetables were dehydrated. When freshly dehydrated these products were palatable and possessed fair nutritive value, but, after being transported abroad, they were found to be markedly changed in palatability, odor, color, and vitamin content. In view of the fact that large quantities of vegetables are again being dehydrated for the use of our armies and our allies, it is of great importance to know whether or not these products will really retain their palatability and nutritive value during storage.

Since the last war, it has been found that both carotene and ascorbic acid are retained better in dehydrated vegetables if the enzymes of the vegetables are inactivated either by drying¹ at a sufficiently high temperature, or by

precooking² the vegetables prior to dehydration. Precooking (blanching) of vegetables to be frozen has also been found necessary in order to obtain retention of these vitamins during cold storage.^{3, 4} The U. S. Army specifications now require sufficient precooking of all vegetables (except onions) to inactivate peroxidase prior to dehydration.

The work reported in this paper was part of a study of the nutritive values of dehydrated vegetables carried out coöperatively with the U. S. Bureau of Home Economics, the New York State College of Home Economics, the University of California, and the University of Texas. The object of the particular study herein presented was to determine first what losses of carotene, thiamin, and ascorbic acid occur during the dehydration of cabbage, beets, rutabagas, and potatoes in a commercial plant in New York State, and second at what rate these vitamins may be lost during subsequent storage under various conditions.

ANALYTICAL METHODS

Moisture—Difficulties were encountered at the start with as simple a determination as moisture. Drying of the ground sample in a vacuum oven at 158° F. for 6 hours was soon found to be the only absolutely reliable method.

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Carotene—The method described by Zimmerman, Tressler, and Maynard⁵ was employed.

Thiamin—The method of estimating thiamin used was the "Standard thiochrome assay for the determination of thiamin in cereal products" recommended by the Research Corporation Committee on the Thiochrome Method⁶ as modified by Moyer and Tressler.⁷

Ascorbic Acid in Cabbage, Rutabagas, and Potatoes—The Bessey and King⁸ procedure as modified by Mack and Tressler⁹ was employed.

Ascorbic Acid in Beets—The electro-metric titration method described by Kirk and Tressler¹⁰ was used.

The Preparation of the Dehydrated Vegetables

The vegetable samples studied were taken at various stages in the process of dehydration at the Dry-Pack Corporation plant at Lyons, N. Y. A brief description of raw vegetables and of the treatment given them during processing follows:

Danish Ballhead cabbage from Wayne County, N. Y., which had been stored for about a month, was trimmed of outer leaves, cored, and then shredded as for sauerkraut. Without further treatment it was spread on stainless steel trays and dehydrated for about 4 hours in a current of warm air in a cabinet drier. Rutabaga turnips from the Province of Ontario were washed, then peeled and diced. The product was blanched for 2 minutes in water near the boiling point and then cooled in water for 2 minutes. After draining, the diced turnips were spread on trays and dehydrated in the same manner as the cabbage.

Beets grown near Alton, N. Y., which had been stored for approximately 2 months, were thoroughly washed, then cooked in boiling water until almost done. The cooked beets

were peeled, trimmed, diced, and then spread on trays and dehydrated in the same manner as the cabbage.

Heavy Weight potatoes grown near Lyons, N. Y., which had been stored in a cellar for approximately 4 months, were washed, peeled in a potato peeler, again washed, shredded into small sticks of rectangular cross-section, which were blanched for approximately 2 minutes in water near the boiling point and then cooled with water in a rotating drum. The product was spread on trays and dehydrated as described for cabbage.

MOISTURE CONTENT OF THE DEHYDRATED VEGETABLES

The freshly dehydrated vegetables contained the following percentages of moisture:

| | Per cent Moisture |
|---------------------|-------------------|
| Rutabagas | 8.4 |
| Beets | 5.5 |
| Cabbage | 5.5 |
| Potatoes | 7.0 |

LOSSES OF VITAMINS DURING DEHYDRATION

The Danish Ballhead variety of cabbage is nearly white, except for the outer leaves which were discarded. Consequently, it was so low in carotene that the amount present was not determined. On a dry weight basis the fresh cabbage contained 5.92 μ g. thiamin per gm., and 4.40 mg. ascorbic acid per gm. After dehydration the amounts found were 5.60 μ g. thiamin and 3.56 mg. of ascorbic acid, indicating little loss of thiamin but approximately a 20 per cent loss of vitamin C.

The losses of carotene, thiamin, and ascorbic acid from rutabagas during preparation and dehydration are shown in Table 1. It will be noted that during blanching the losses of carotene, thiamin, and ascorbic acid were approximately 2, 17, and 22 per cent, re-

spectively. Dehydration itself caused little loss of carotene and thiamin. On the other hand, little ascorbic acid is left in the dehydrated turnip, 85 per cent being destroyed.

The beets were substantially cooked preparatory to dehydration. This caused a loss of approximately 16 per cent of the thiamin and about the same amount of ascorbic acid. Dicing and dehydration caused only a relatively small additional loss of thiamin and an additional 15 per cent loss of ascorbic acid (Table 2).

Potatoes* (Table 3) lost approximately one-third of their thiamin and 60 per cent of their ascorbic acid content during shredding and water blanching. No additional thiamin was lost during dehydration but the ascorbic acid content was nearly completely destroyed.

TABLE 1
Vitamin Content of Rutabagas Undergoing Dehydration
(Dry Matter Basis)

| | Carotene * | Thiamin | Ascorbic Acid |
|----------------------------------|-------------|-------------|---------------|
| | μg. per gm. | μg. per gm. | mg. per gm. |
| Fresh | 39.6 | 7.07 | 3.16 |
| After slicing | 37.2 | 7.14 | 3.12 |
| After blanching in boiling water | 36.5 | 6.10 | 2.45 |
| After dehydration | 36.0 | 5.89 | 0.42 |

* Total carotenoids

TABLE 2
Vitamin Content of Beets Undergoing Dehydration
(Dry Matter Basis)

| | Thiamin | Ascorbic Acid |
|-----------------------------------|-------------|---------------|
| | μg. per gm. | mg. per gm. |
| Fresh | 2.40 | 0.24 |
| After precooking in boiling water | 2.01 | 0.20 |
| After slicing | 2.03 | 0.20 |
| After dehydration | 1.93 | 0.17 |

* It should be noted that stored potatoes relatively low in vitamin C were used. If the freshly dug product had been used, the vitamin C content might have been higher.

TABLE 3
Vitamin Content of Potatoes Undergoing Dehydration
(Dry Matter Basis)

| | Thiamin | Ascorbic Acid |
|----------------------------------|-------------|---------------|
| | μg. per gm. | mg. per gm. |
| Fresh | 6.17 | 0.76 |
| After shredding | 6.28 | 0.56 |
| After blanching in boiling water | 4.19 | 0.30 |
| After dehydration | 4.75 | trace |

STORAGE STUDIES

Immediately upon receipt of each one of the samples of the dehydrated vegetables at the laboratory, it was packaged in three ways: (1) in tightly closed glass containers; (2) under carbon dioxide in tightly closed glass jars; (3) in either moisture-proof cellophane or pliofilm bags. One of each of these samples was stored at each of the following temperatures: -40° F., 33° F., 58° F., and 75° F. In the case of the samples held under carbon dioxide, the air was eliminated by slowly passing in carbon dioxide for 30 minutes through a tube reaching to the bottom of the jar.

The samples were analyzed monthly for ascorbic acid and quarterly for carotene and thiamin.

Regardless of the type of container or storage condition, none of the samples lost an appreciable amount of thiamin during the test periods of 3 or 4 months.

No one of the samples stored at -40° F. lost much carotene. At higher temperatures the loss was much more rapid (Figure 1). Storage under carbon dioxide reduced the loss of this vitamin; the advantages of storage under carbon dioxide were particularly noticeable at the highest temperature (75° F.).

No one of the samples of rutabagas (Table 4) or cabbage (Figure 2) lost much ascorbic acid during storage at -40° F. for 3 months. At higher tem-

FIGURE 1

ASCORBIC ACID CONTENT OF CABBAGE IN STORAGE

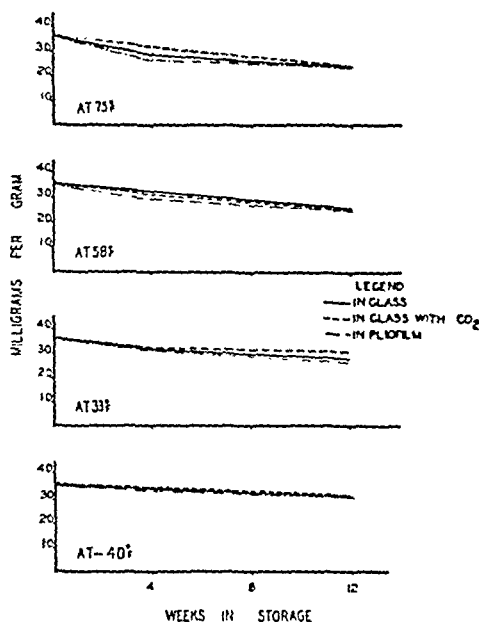
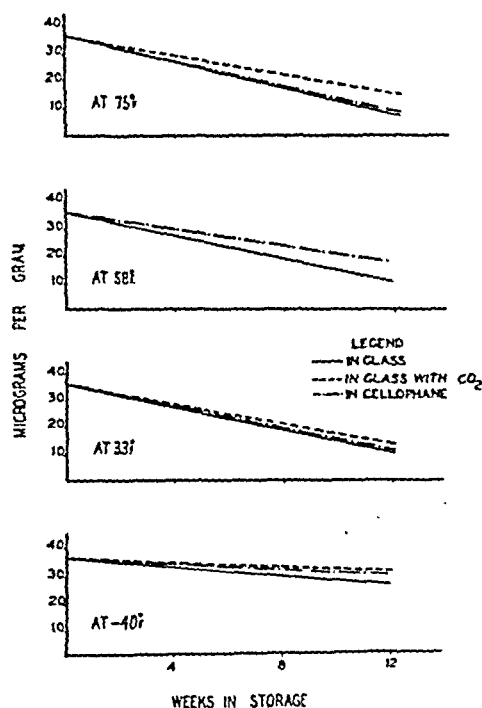


FIGURE 2

CAROTENE CONTENT OF RUTABAGAS IN STORAGE



peratures, there was a considerable loss from all of the samples of these vegetables. In general, the higher the temperature the more rapid the loss, although there are some apparent discrepancies owing to the difficulty of obtaining truly representative samples. Storage under carbon dioxide seemed to have little effect in retarding the

rate of loss of ascorbic acid from these vegetables.

It should be noted that these samples were relatively high in moisture. If dehydrated vegetables containing less moisture had been used, the rate of loss of carotene and ascorbic acid might have been lower.¹¹

TABLE 4

Ascorbic Acid Content of Dehydrated Rutabagas during Storage

| Period in Months | Condition | Storage Temperatures | | | |
|------------------------|-----------------|----------------------|--------|--------|--------|
| | | -40° F. | 33° F. | 58° F. | 75° F. |
| 0 | | 0.42 | 0.42 | 0.42 | 0.42 |
| 1 | Air | 0.32 | 0.47 | 0.28 | 0.36 |
| | Cellophane | 0.47 | 0.47 | 0.36 | 0.38 |
| | CO ₂ | 0.38 | 0.60 | .... | 0.39 |
| 2 | Air | 0.27 | 0.45 | 0.43 | 0.26 |
| | Cellophane | 0.34 | 0.55 | 0.26 | 0.24 |
| | CO ₂ | 0.34 | 0.36 | .... | 0.35 |
| 3 | Air | 0.38 | 0.35 | 0.37 | 0.31 |
| | Cellophane | 0.44 | 0.40 | 0.38 | 0.43 |
| | CO ₂ | 0.43 | 0.46 | .... | 0.34 |
| 4 | Air | 0.41 | 0.21 | 0.18 | 0.16 |
| | Cellophane | 0.38 | 0.26 | 0.19 | 0.19 |
| | CO ₂ | 0.42 | 0.34 | .... | 0.17 |

SUMMARY

The carotene, thiamin, and ascorbic acid contents of rutabagas, beets, cabbage and potatoes were followed during commercial dehydration and subsequent storage under controlled conditions. Prior to storage the dehydrated vegetables were packaged in three ways: (1) in glass containers, (2) under carbon dioxide in glass containers, (3) in either moisture-proof cellophane or pliofilm bags. Storage temperatures employed were (1) -40° F., (2) 33° F., (3) 58° F., and (4) 75° F.

Little carotene was lost from any of the vegetables during dehydration but the loss of this vitamin was relatively rapid at all storage temperatures above -40° F. Storage under carbon dioxide helped to prevent rapid loss.

Some thiamin is dissolved out during hot water blanching. Subsequent storage caused no further loss.

Potatoes lost nearly all of their ascorbic acid content during blanching in hot water and subsequent dehydration.

The fresh beets contained a relatively small amount of ascorbic acid. About one-third of this was lost during pre-cooking and subsequent dehydration. The resultant product was not a good source of vitamin C.

Rutabagas lost approximately 85 per cent of their ascorbic acid during water blanching and dehydration. The remainder was fairly well retained at the lower storage temperatures but at

either 58° F. or 75° F. more than half is lost in 4 months. Storage under carbon dioxide had little effect in retarding the rate of loss during storage.

Cabbage retained its vitamin C content better than any other vegetable during dehydration and subsequent storage. That tested was high in vitamin C containing more than 3 mg. ascorbic acid per gm. of dehydrated cabbage.

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Ultra-violet Irradiation as a Means of Disinfection of Air*

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THE bactericidal power of ultra-violet radiation has been known for many years. Careful studies on the wavelength dependence of this action of ultra-violet radiation established that the region of the spectrum in which waves are shorter than $3,000\text{\AA}$ is quite efficient in the killing of microorganisms, and that bacteria and fungi show their highest sensitivity around $2,600\text{\AA}$. Preliminary studies on the effect of wavelength $2,537\text{\AA}$ on certain animal viruses indicate that these viruses in a purified state have a sensitivity similar to bacteria at wavelength $2,537\text{\AA}$. The development of low pressure mercury vapor lamps with glass or quartz envelopes which emit about 80 per cent of their radiation at wavelength $2,537\text{\AA}$, very close to the maximum of highest bacterial sensitivity, has made available a ready and inexpensive means to be used for many practical purposes. This development coincided with the reawakening of interest in the control of air-borne contagion which was brought to the foreground in this country by W. F. Wells.

Although low pressure mercury vapor lamps have been used extensively in connection with air-borne microorganisms, it is only in the last three years that quantitative laboratory investiga-

tions on the efficiency of $2,537\text{\AA}$ radiation on air-borne bacteria, under carefully controlled conditions, have been conducted. After the early work of Wells, the papers by Koller, Sharp, Luckiesh, and Holladay, and Rentschler and Nagy, have helped considerably to clarify some of the problems in connection with the killing of microorganisms in air. These and other studies have also helped to focus our attention on some of the important contradictions which have appeared in this field.

Fundamentally, a bacterium should have equal sensitivity whether it is on an agar surface, in liquid suspension, or floating in the air. The killing should depend only on the amount of bactericidal energy absorbed; of course the biological history of the organisms should be the same in regard to media, age, and other biological factors. However, a number of investigators have found that there are differences in sensitivity when bacteria are irradiated in a dry, or when irradiated in a humid atmosphere. These may be due to a number of factors, some of which we will discuss.

METHOD OF SAMPLING

Experiments were conducted at the National Institute of Health with a number of different sampling devices, i.e., open plate method, the Wells centrifuge, and the Hollaender-DallaValle funnel device. These tests showed that,

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depending on the humidity, dust content, and probably others factors, the different methods of sampling do not give necessarily parallel results. This appears reasonable if we follow the manner in which these devices remove bacteria from the atmosphere. The open plate method practically depends on gravity alone; the Wells centrifuge depends on moderate centrifugal force; and the funnel device emphasizes gravity through a strong impinging force.

There is very little doubt that similar factors which modify the sampling rate help also to modify probably the survival rate of the bacteria suspended in air when irradiated. This is, of course, very difficult to evaluate if we do not know the limitations of our sampling methods. It is urgently necessary to evaluate the different sampling devices and to establish the limitations of each.

CHANGE IN SENSITIVITY

Another factor which may contribute to the apparent variation of sensitivity in dry and humid atmospheres is the fact that bacteria which have survived exposure to ultra-violet radiation show less resistance to adverse conditions than normal bacteria, although this condition is more pronounced with bacteria irradiated with the very long ultra-violet. It may very well be possible that the dry atmosphere which is an unnatural medium for certain bacteria will enhance their ultra-violet sensitivity.

ADEQUATE IRRADIATION

The question of adequate irradiation of the air for the control of air-borne contagion has come up for consideration. It seems impossible at the present time to define quantitatively the radiation necessary to produce adequate disinfection. Several papers on this subject have appeared. The data in these reports are based on the lethal

effects of ultra-violet radiation on "clean" bacteria sprayed into the atmosphere. Such data are very useful since they give us the minimum intensity which should be supplied if the conditions are ideal. The Council on Physical Therapy of the American Medical Association states in its acceptance of ultra-violet lamps for disinfecting purposes that "obviously the manufacturer and distributor of such lamps must assume some responsibility for the adequacy of the lamp installation for purposes of radiant disinfection of the air, and for the adequacy of the protection from injury of the occupants of the space irradiated." This is certainly a reasonable point of view.

TYPE OF INSTALLATION

The methods used in the control of air-borne contagion are usually the following:

1. *Irradiation of the upper one-third of the room*—In this case the lamps are placed so that the light is reflected to the ceiling. A certain amount of the light is reflected or scattered back into the lower level, depending on the arrangement of the lamps and the type of paint used on the ceiling and walls. Only the upper one-third of the room will receive enough bactericidal radiation to kill microorganisms within a reasonable time. One usually depends on natural circulation in the room or uses forced circulation to bring as often as possible all the air in the room to the bactericidal radiation. If the ceiling is high this may give quite an effective arrangement. Some of the most successful installations use this technic.

2. *The ultra-violet screen method*—This mode of control of air-borne contagion is used most extensively in hospitals. It is often installed across corridors or cubicles to control the circulation of bacteria. Successful installations for the control of air-borne contagion have been reported from

children's hospitals where such screens have been placed at the entrance of each cubicle. If the ultra-violet screens are used in hospital corridors across the passage from one part of the building to another, this method appears less promising. To kill organisms in the air passing through the screen, or especially on the clothing of nurses and physicians, the radiation would have to be so intense as to make it quite dangerous for persons to pass through such screens.

Another type of screen has been suggested which practically would surround the bed of each patient with ultra-violet curtains, or place ultra-violet curtains in the aisles between school benches. Such installations would appear to me to be rather dangerous to use since inadvertent exposures of exceedingly dangerous character could not be avoided.

3. *Irradiation of air in air ducts or in plenum*—In this type of installation, ultra-violet sources are located inside the air ducts or the plenum. Often the inside of the walls of the ducts are covered with ultra-violet reflecting paints in an effort to make best use of the radiation. Considerable work has been done in designing and testing such installations by a number of commercial laboratories. However, no actual epidemiological data seem to have been published on the reduction of air-borne infections in buildings with such equipment. It would appear that such installations are of considerable promise, especially in air-conditioned buildings, since they would avoid the exposure of the occupants to ultra-violet radiation.

PRECAUTIONS

The greatest danger involved in the use of bactericidal (2,537Å) radiation is the possibility of over-exposure. Very little is known about the effect of 2,537Å radiation on the eyes and skin

of the occupants of the rooms. Most manufacturers supply some warning in regard to the use of these lamps. But in regard to some of the installations, we have observed that too little or no warning was given in regard to the dangers involved in extensive exposures of 2,537Å radiation. Time and again reports have appeared that workers in operating rooms, and other places equipped with 2,537Å lamps, have been adversely affected by this radiation. It also should be mentioned that many of the effects of ultra-violet appear not earlier than several hours after exposure.

Another point which should be emphasized is the production of ozone by these lamps. There seems to be no danger connected with this if the ventilation is good. However, if the air becomes stagnant and the lamps continue to burn, the concentration of ozone may reach toxic levels. Since there is very little information available on the toxic limits, or on methods of determining these limits, it would be very well if research on these problems were encouraged.

SCHOOLS

An outstanding study on the use of ultra-violet radiation in the control of air-borne contagion in schools has been described by Wells, Wells, and Wilder. Using similar installations, rooms in the Germantown Friends School and the Swarthmore Public School were equipped with low-pressure mercury-vapor lamps. These lamps irradiated the upper one-third to two-fifths of the school rooms, the radiation being reflected toward the ceiling. Only relatively little radiation comes to the level of the benches in these rooms. It would have been helpful had actual measurements been given.

These tests were conducted over a 4 year period at the Germantown School and for a 1 year period at the Swarth-

more School. Considerable decrease in mumps morbidity was noted in the irradiated rooms at the Germantown School. In both schools the incidence of measles in the irradiated rooms was considerably lower than in the rest of the schools during the 1941 measles epidemic.

As mentioned in the beginning of this discussion, more data are desirable in regard to the physical setup, intensity of radiation sources, and the effect on the children and teachers of the scattered ultra-violet and the peculiar blue light given by these lamps. Also, a survey of the natural bacterial population in control and irradiated rooms would have helped to understand these striking results.

HOSPITAL INSTALLATIONS

The danger of cross-infection which is always present even in the best conducted hospitals has made them a good proving ground for the usefulness of ultra-violet radiation in controlling air-borne contagion. Especially is this the case in children's hospitals. Many of the findings of recent experiences in this field are discussed in the volume *Aerobiology*. Good results were obtained at the Hospital for Sick Children in Toronto where respiratory infection was reduced from 40 per cent in the control rooms to 10 per cent in rooms irradiated with ultra-violet. Less convincing results were obtained at the Infants' Hospital in Boston using ultra-violet screens across the entrance to the cubicles. At the Home of Hebrew Infants in New York, the method of irradiating the upper one-third of the room was used to control air-borne contagion, and it was found that infection could be reduced by 50 per cent in rooms irradiated with ultra-violet. At the Cradle in Evanston the screen method of ultra-violet irradiation compared very well with mechanical barriers in the control of air-borne

contagion from cubicle to cubicle. The article by Stokes and Henle on "Prevention of Epidemic Influenza," with a discussion of the usefulness of ultra-violet light in control of this virus disease is of interest. According to these writers, ultra-violet light compared very well with propylene glycol Aerosol.

Against these positive results there are very few negative reports. In none of the publications has mention been made of how much radiation the exposed persons have actually received. The Council of Physical Therapy of the American Medical Association has, in its acceptance of germicidal lamps for disinfecting purposes, given a very definite value of 5 ergs/cm²/sec. for 8 hours exposure and 1 erg/cm²/sec. for 24 hours exposure. Have these limits been kept in these installations? It is requisite that publications on this subject give data on the actual intensities used for disinfection of the air and the quantity of ultra-violet radiation to which the occupants are exposed.

The use of ultra-violet radiation in the control of air-borne microorganisms in operating rooms has been introduced by Hart. He reports that ultra-violet radiation (2,537Å) offers the simplest and most effective means of controlling air-borne wound infection. He especially emphasizes the protection of the personnel against over-exposure.

There are several investigations in progress on the usefulness of ultra-violet radiation in the control of air-borne contagion in crowded quarters. Since it usually takes several years to obtain reliable data in such investigations, it would be premature to discuss them.

There have also been reports upon the use of ultra-violet radiation in controlling bacteria and fungi in meat packing plants, instrument cabinets, etc. Most of these matters are still in a controversial stage.

CONCLUSIONS

We have in ultra-violet (2,537Å) radiation a highly effective tool for the killing of microorganisms. Since other living cells do not differ fundamentally from bacteria in their sensitivity, this radiation will affect other cells in about the same way it affects microorganisms. It will either kill them or damage them, modify them temporarily or change them permanently (genetically). It is essential that we become conscious of the danger of ultra-violet radiation if used carelessly. The practical application of light of wavelength, 2,537Å will do no harm if fundamental precautions are taken to protect the uninformed person. The Council of Physical Therapy of the American Medical Association has given recommendations in connection with the acceptance of these lamps. In a review of the literature I find that little reference is made to the precautions suggested in this "acceptance," although not enough time has elapsed since its publication.

Among the problems in connection with ultra-violet radiation which need further laboratory study and clarification, are the following:

1. Reevaluation of the sampling methods for air-borne organisms now in use, to establish their limitations and shortcomings, especially in regard to humidity, dust, etc., in an effort to improve them.

2. Requirements in regard to installation of 2,537Å lamps, especially with regard to

those designed for the protection of the people exposed.

3. Evidence submitted in regard to the usefulness of ultra-violet radiation in control of air-borne contagion.

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Health Education in a Medium Urban Community*

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HEALTH education is a tool, like sanitation, immunization, law enforcement, or medical care. It is a medium through which health agencies attempt to prevent disease, lower the death rate, and increase the physical and mental vigor of the people they serve.

Mustard says that health education "is that process or those procedures through which, directly or indirectly, individuals who make up the public or a particular segment of the public are brought to a performance of those things believed to be beneficial to health, and to an abstinence from those things believed to be injurious to health."¹

A successful public health program demands and receives the support of the people who benefit from it. Some departments of health have achieved outstanding success in all fields; other departments have attacked and conquered particular problems, one at a time, while conducting a general program.

Success or failure of a particular program depends upon the knowledge which the people have of its general objectives. The laity must know the potential resources for health in order

to take an intelligent part in its acquisition and development. Furthermore, the desire for health implies the willingness to share in efforts to obtain it and to participate in the creation of individual and common resources for its protection and advancement in quality and quantity. To this end, the relevant facts of human life, the natural history of preventable diseases, of remediable and preventable defects, and the causes of premature death, as well as the record of progress for extension of the span of life must be widely understood, not only among public health workers but among the laity as well.

Building today upon the work of pioneers such as Sir Edwin Chadwick, Dr. John Snow, Hiram F. Mills, George W. Fuller, Earle B. Phelps among the sanitarians, and Koch, Pasteur, Stephen Smith, William H. Park, Theobald Smith among the bacteriologists and physicians, public health workers have reared a structure which has definite form and purpose and in which there is balance between the control of the environment and the promotion of individual hygiene.

The problem of the local health administrator is to build a well balanced and coördinated system of health service. The job cannot be done by the administrator himself; he may be ever so able a leader but, without the proper working tools, he can accomplish little. What then are these working tools? In

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my opinion the most important instrument for achieving success is personnel. By "personnel" is not meant mere office holders, but employees with adequate technical training and proven ability for the specific duties assigned to them. In other words, a local health department cannot be expected to accomplish a herculean task without securing the ablest talent the market affords.

The principles of organization and service in public health are the same regardless of whether the department serves a few thousand or several hundred thousand people. The health department which serves a county of 30,000 population will have a health officer and necessary nursing, inspection, and clerical personnel.

A properly organized local department of health serving a medium urban community will usually have essential bureaus or divisions manned by specialists in their particular fields. The health officer in conjunction with the chiefs of divisions should formulate the general policies, outline qualifications of personnel to be employed, indicate essential items in the program, and prepare the necessary manual of operation to be used in the promotion of public health. The general program should be submitted to the members of the board of health for their information and, if necessary, for their approval; in turn, it should reach the state health officer for his approval.

Since the local department of health is a definite entity and functions as such, monthly reports should be submitted to the state health department; these reports contain a summation of activities and accomplishments of the personnel. Special reports may also be submitted. These reports constitute a part of the material upon which the state department of health bases its work in education and they serve the local health department similarly as

basic information for its educational work.

No longer can those who are interested in public health work entirely satisfy their communities or the art and science of preventive medicine through the traditional programs to control infectious diseases, to detect physical defects of school children, or to teach the health rules of nutrition, rest, and physical recreation. Health departments must serve as a potent influence to keep individual and community health operating at their highest level.

Nassau County, N. Y., is offered as an example of a medium urban community where what is hoped will be an effective health program is in its early stages. Nassau County is on Long Island, its western boundary line adjoining New York City, extending from Long Island Sound on the north to the Atlantic Ocean on the south, a distance of 23 miles. The county is 16 miles wide from the New York City boundary line on the west to Suffolk County on the east. It has a land area of 274.9 square miles.

The county seat is located at Mineola, in the approximate center of the county; component parts include 2 cities; 63 incorporated villages, and 3 townships. The population in 1900 was 55,689; in 1920 it was 126,120, and increased to 406,748 in 1940. Due to a marked increase in war industry it is believed the population now exceeds 450,000.

The county operates under the County Government Law of Nassau County, otherwise known as the Nassau County Charter. Prior to January 1, 1938, each city, incorporated village, and township had its own board of health and part-time health officer, a total of 68 uncoordinated health jurisdictions. These municipalities had, in addition, 11 public health nurses, 10 inspectors, and 7 stenographers and

clerks. The Public Health Committee supported by county tax funds had 6 public health nurses and attempted to carry on a county-wide service; due to limited personnel, major emphasis was placed on clinic and follow-up service.

In accordance with the provisions of Chapter IX of the Charter, Nassau County became a county health district, local boards of health were abolished and their powers and duties were transferred to the county department of health. A single board of health composed of 5 members appoints the commissioner who is the administrative head of the department and serves for a 6 year term. The Charter also transferred local health department employees to the county health department together with 37 part-time health officers who became deputies of the commissioner, serving until the respective terms expired for which they had been appointed. The last of such part-time deputies completed his term about 1½ years ago. Appointments of personnel since the inception of the department, other than the commissioner and deputy commissioner, have been subject to requirements of the Nassau County Civil Service Commission.²

Nassau County is in the New York City district of the New York State Department of Health and the services of the District Health Officer are continuously available for guidance and assistance. Since the county department of health has met all requirements of the State Department of Health, its expenditures are annually reimbursed in the amount of 50 per cent.

The department program is administered through 5 divisions, namely: Communicable Diseases, Sanitation, Public Health Nursing, Maternal and Child Health, and Statistics and Records. The department does not have a division of health education; this activity is directed by the commissioner. Usual and accepted methods of

health education were inaugurated when the department was organized in 1938; their expansion has paralleled that of the department.

Numerous less tangible but nevertheless important media of health education are inherent in health department organization. The degree to which they may be recognized as contributing to health education is dependent upon the quality and extent to which they are employed.

The epidemiologist has an excellent opportunity to give information to the public during his investigations, and also to render medical advisory assistance to the public health nurse and the sanitarian.

Public health physicians engaged in the administration of various services such as venereal disease, tuberculosis, and maternal and child health, act as a guide to both the medical and nursing professions as well as in the formulation of disease control and health education programs.

Among the various media, perhaps the most productive is the informal instruction given by the public health nurse through personal visits and group conferences. This statement is made with full appreciation of previously reported studies which have challenged the educational value of the nursing visit and is based upon two concrete factors: (1) the department policy of providing in-service training and experience for the staff nurse in each special field before full responsibility for instruction in that field is placed upon her, and (2) quick returns from nursing visits denoted by action on the part of those visited.

After 4½ years the department's nursing service is now generalized; complete generalization, however, was reached only as in-service training could be provided in the various services.

Prior to the transfer of tuberculosis

nursing service in 1939 from the Nassau County Sanatorium to the department of health a series of 17 carefully planned lectures on diagnosis, treatment, and control of the disease was given to the nurses by the superintendent of the sanatorium. These lectures were followed by a physical examination of each nurse in the outpatient clinic and a period for observation, including participation in the sanatorium program. Case summaries were prepared by the nurse formerly responsible for tuberculosis nursing; she then, in the capacity of consultant, gradually turned over the case load and assisted both supervisors and staff nurses alike in assuming full responsibility. Since the staggering case load formerly attempted by two nurses was spread among 33 nurses, results were immediate. Since that time, clinic attendance has continued to improve, many lost cases have been brought to light and new cases found.

A similar plan of training for the nursing staff was followed before the cancer nursing service was absorbed. The medical consultant of the Tumor Clinic assumed responsibility for a series of 19 lectures, for which he secured some of the best specialists in the county and in the metropolitan area. These lectures covered the general aspects of the problem, symptoms, diagnosis, surgery and the use of x-ray and radium. The last four lectures were on the general topic of "Cancer and the Community." The practical experience program included 8 days of planned observation and practice, the nurse being given an opportunity to become acquainted with tumor patients from her own district. Gradual transfer of the case load to the department of health by the Cancer Committee nurse was accomplished by use of a case summary sheet. Each case was discussed with the public health nurse by the nurse employed by the Cancer

Committee, the latter thus becoming a consultant in cancer nursing.³

In further preparation for the maternity nursing service a course of 20 weekly 2 hour lectures and demonstrations in obstetrical nursing was arranged with Maternity Center Association of New York City. All members of the field nursing staff enrolled in and completed this special course, following which there was an immediate increase in standards and services in maternity nursing.

It is reasonable to expect a relatively high quality of instruction as a result of exposure to experiences provided through this particular pattern of staff education which included: (1) theoretical instruction regarding the scientific facts concerning the disease or condition; (2) observation of diagnostic, treatment, and control methods in special centers for care; (3) participation in the special center program to gain a complete understanding of all aspects of the disease or condition, and (4) immediate field experience under close supervision. This pattern followed in improving the quality of the various services mentioned is now in progress in orthopedics.

Other factors which influence the quality of instruction given by the public health nurse also include: (1) regular staff conferences, (2) participation in the student program, and (3) individual study program.

The three point staff conference program plan includes: (1) interpretation of new policies; (2) free discussion and group problem solving, and (3) formal presentation of current research, book reviews or other pertinent contributions in the health and medical fields. Formal presentations are arranged by a staff committee and may include discussions by some member of the group, by administrative personnel of the department of health, or by some individual outside the department of health

who has especial qualifications to make a contribution which will further enrich the background of the field nurse.

The department is fortunate in being recognized as a center for field experience for graduate students in public health nursing. The responsibility for interpreting field service to these advanced students is a constant stimulant to improve the teaching content of visits. The informal interchange of experience also offers an opportunity for further enrichment.

In the individual study program it is significant to note that during the past 4½ years, a staff increasing from 17 to 35 nurses, has through self-directed study taken 182 courses (for which they paid \$3,788), involving 6,122 hours of their personal time, exclusive of travel and study. Five nurses have had extended periods of study, one completing degree requirements.

These means of improving the contribution of the public health nurse to the community health education programs have also been extended to nurses in all nonofficial agencies.

Because all members of the nursing staff are qualified civil service employees, have been given in-service training in special services, carry out a planned program of individual study, keep up-to-date through staff conferences, and receive individual help through supervision on the job, each nurse in her own right is actually a health educator and carries an effective health message into each home or place she visits.

Last year the nursing staff made approximately 35,000 visits. Although many of these were revisits, this represented the direct exposure of 48,600 Nassau County residents to some phase of health instruction but an unknown number of indirect contacts, and exclusive of the number attending clinics. Based upon the preparation of the nurse for her work and the apparent

response of individuals to her visits, it is justifiable to recognize this volume of work as a distinct contribution to the community health education program.

A second medium of public health education is available through personnel dealing with sanitation, although to a lesser extent. The educational and police work of this group involves contact with a wide variety of problems and people. The limitations on the effectiveness of health education through this personnel is occasionally due to deficiencies of educational and technical training in the individual, which will of course be overcome in time as qualified personnel replace inherited and unqualified appointees.

Upon the formal establishment of the department's Division of Sanitation, a course of in-service training was instituted and carried on over a period of a year under the supervision of the director. This instruction served to acquaint the personnel with technics of their own duties and gave them a broader picture of public health work in general. This first course amounted to 100 hours of instructions and supervised field experience.

Subsequently those of the inspection staff who had adequate educational background completed a university course in food sanitation. Food inspection personnel have also participated in short courses given through the State Education Department and are regular attendants at conferences of food officials in the metropolitan area.

These representatives of the health department have in turn become better able to accomplish their objectives in the field which are basically educational and satisfying to the citizens contacted to the extent that they meet a need for service and information.

The extent of the type of this contact with the public is indicated by the more than 32,000 inspections and field

visits during 1941. The actual number of residents reached by this service is considerably greater than the number of inspections.

Exigencies of the war have brought group instruction to the front as a means of community health education to an extent heretofore unparalleled. The past year has afforded an opportunity to reach persons in all strata of society displaying an eagerness to learn. Organized groups of influential and economically independent citizens have invited department representatives to teach them facts regarding community health services and their utilization, as well as other factors that will contribute to healthful living. The administrative staff has become part of a county faculty which is constantly called upon to lecture to various groups in training for defense activities. During the past 9 months this service has included a total of 51 lectures.

In addition, staff nurses have taught 325 home nursing class sessions, 294 mother's class sessions, and 43 classes in first aid; total attendance for these 662 class sessions was 7,641 persons.

During the past summer a plan of group instruction was inaugurated among workers in defense schools and industries. To date, 32 sessions have had an attendance of 2,274 men and women. Instruction to industrial workers is planned in units of four lectures upon: personal health, community health, nutrition, and child care.

Through nursing and sanitation personnel and also including visits by epidemiologists and other department physicians it is believed that about one-fourth of the total population of Nassau County had some personal awareness of the department of health and its relation to their own health and well-being during the year 1941. This does not include but is supplemented by the dissemination of health information by other means previously referred to.

A third medium, that of department representation on a variety of community advisory boards and committees, provides opportunity for effectively reaching an influential group of citizens occupying key positions in bringing about changes in community thinking and action.

Administrative personnel of the department have continuously participated in the activities of such county organizations as the Nassau County Medical Society, The Nassau County Tuberculosis and Public Health Association, the Nassau County Cancer Committee, Nassau County Central Index, Nassau County School Health Council, Nassau County Public Health Nursing Council, Nassau County Chapter of the American Red Cross, Nassau County Nutrition Council, the Nassau-Suffolk Conference of Waterworks Superintendents, Long Island Section of the New York State Sewage Works Association, and public official groups such as building and zoning officials. More recently these activities have been extended and are included in connection with the Office of Civilian Protection of the Nassau County War Council.

Participation of this type not only affords face to face opportunities for health education but ties in the resources for these social and philanthropic organizations to the total community program.

SUMMARY

1. Nassau County is an urban community consisting of both thickly and sparsely settled communities and having a total population of about 450,000 persons.

2. Considering Nassau County as a medium urban community, the health education program is reviewed on the basis of 4½ years' work by a single county department of health.

3. Usual and accepted procedures in health education were adopted and have been used since the department was organized in March, 1938. In addition, certain routine functions of the department are considered from the standpoint of their relationship to health edu-

cation, particularly in the fields of epidemiology, nursing, and sanitation.

4. The effectiveness of these aids is dependent upon individual abilities based on prior education and in-service training and their spirit and attitude in personal contacts with the general population and various organizations.

5. The accomplishments of field personnel in health education are in turn dependent upon the stimulus of capable administrators.

6. The quality of health department service governs the extent to which other community agencies accept direction and participate in the organized health education program.

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SIR ARTHUR NEWSHOLME, K.C.B., M.D. (LOND.), F.R.C.P.

INFORMATION that Sir Arthur Newsholme had died was somewhat delayed in reaching the United States, but this does not dull the sense of loss which will be felt by those who knew him or knew of him. His acquaintanceship in the United States and Canada was wide, and his prestige rested upon a fine foundation of professional accomplishment and personal graciousness. It should be recorded that we, in America, regarded him as a great man; and for our American annals we can do no better than to re-publish the obituary notice that appeared in the *Lancet* of May 29, 1943, which is as follows:

"The death of Sir Arthur Newsholme on May 17 at the age of 86 removes a landmark in our national system of public health of which he was both the reformer and the chronicler. During those eleven crowded years in Whitehall when he was medical officer to the Local Government Board, before its absorption in the Ministry of Health, the emphasis shifted from sanitation to personal hygiene. He had a vision of human lives emancipated by their own effort and he set his course to provide the conditions of healthy living.

"Arthur Newsholme was born at Haworth, and his memories went back to the 'sixties and talks with people who had known the Brontes in that West Riding town. His mother was early left a widow and he won his way through school and college with the help of scholarships. After a year as apprentice to a Bradford practitioner he entered St. Thomas's Hospital at a time when surgery was coming to life in the carbolic spray, and where he listened to Sir John Simon's last lecture. Qualifying LSA in 1879 he was house-surgeon there and held other resident posts while he was taking the London MB with several honours and the gold medal in medicine, followed by similar distinctions at the MD examination. In 1883 he was appointed part-time MOH for Clapham where he had already been in successful general practice for two years, and in 1888 after taking the certificate in public health he became the first full-time MOH for Brighton (which had just been made a county borough) at a salary of 750 pounds. Here he spent the next twenty years, and his determination to get his principles of public health established in practice, based as it was on his own experience as family

doctor, soon won recognition. It was in Brighton in the year 1899 that the notification of tuberculosis (on a voluntary basis) began in this country and it was here too that serious research started into the aetiology of rheumatic fever, of diphtheria and of summer diarrhea. His demonstration that shellfish may convey typhoid brought him into conflict with interested parties. In the background were numerous mathematical excursions, following up his guide-book (*Elements of Vital Statistics*, 1889) and elaborating the 'fallacies of observation' and the 'fallacies of inference' on the avoidance of which his mind was keenly set. At the conclusion of this period the municipal council testified on vellum to 'the unstinted service by reason of which a continuous and progressive decline in the death-rate has been brought about.'

"His translation, in 1909, to the Local Government Board came about through the wisdom and on the personal decision of John Burns, a kindred spirit in many ways. With years of experience as MOH he was in a unique position to reconcile methods of local and central administration. Steadily, though not without heat and effort, Newsholme overcame the difficulties of an outsider entering the closed ring of Civil Service and piloted the expansion of our public health administration from a predominantly environmental service to a personal service of preventive medicine. On his initiative the anti-tuberculosis and maternity and child welfare activities developed from isolated local efforts to national schemes. In 1916, on the appearance of the report of the Royal Commission on Venereal Disease, he secured the prompt adoption of nearly all its recommendations. And these were only some of the directions in which his single-minded and virile will broke down resistance and implemented wise reforms. The position of independence in which medical officers of health now find themselves, and the resulting advance in public appreciation of health services, is due in large measure to his enthusiasm and example.

"Retirement from Whitehall in 1919 was not the end of his work but the beginning of a new phase. Invited by W. H. Welch to lead the new school of hygiene at Johns Hopkins he had a profound influence on American public health through professional and personal contacts with a new generation of public health officers. His American experience, his familiarity with our own system, and his visits on behalf of the Milbank Fund to European countries and especially to Russia (c.f. *Red Medicine* with J. A. Kingsbury, 1933) found expression in a series of 'International Studies on the Relation between the Private and Official Practice of Medicine,' written with the terse lucidity characteristic of all his reports. This experience and much else is embodied in two autobiographical volumes, *Fifty Years in Public Health* (1935), and *The Last Thirty Years in Public Health* (1936). His worth as an administrator was recognized by honours and responsibilities. He was made CB in 1912 and promoted KCB in 1917. He was president of the Society of MOHs. He sat as crown nominee on the General Medical Council from 1910 to 1919. He examined for the Universities of Oxford, Cambridge and London, and he was a member of the executive of the Imperial Cancer Research Fund.

"Of the manner of man behind this achievement a few words remain to be said. During the years of struggle when he was fighting against obstruction and inertia his critical mind and caustic tongue were sometimes more evident than his generous heart, though generosity of temper and of purse was always near the surface. He had the Yorkshireman's canny delight in a good bargain, as well as some of his bias towards the material side of human welfare. His last ten

years were clouded by the loss of his wife after fifty years of close companionship. But he had his library and his garden, and in his determined maintenance of interest in his fellows he triumphed over bereavement. The Worthington Council of Social Service had won his warm support. During this time too he made many new friends who could testify to unobtrusive acts of kindness, to his invincible cheerfulness, to his alertness of mind, and above all to the transparent goodness which was manifest in him."

STUDENT WAR NURSING RESERVE

LAST October we got a little wrought up over the need for nurses and wrote an editorial about it. The editorial was not released for we were told by colleagues that the situation was very delicate, that brains much better than the Editor's were at work on the subject, and that the then current plans were of the nature of a military secret.

Since that time the typescript of the editorial in question has remained in the Editor's gestation barrel. In the light of recent events, however, it is now brought forward as a springboard for further observations. This is it:

"Thoughtful persons, both professional and lay, are becoming increasingly concerned with the nursing situation. Only the most optimistic can foresee, for the future, a supply of nurses sufficient to meet military and civilian needs. Those in the nursing field have attempted in various ways to solve the problem but the outlook remains disquieting. Because of limitations in numbers, in training, and in availability after training, the Red Cross Nurses Aids, recruited essentially from women of leisure, cannot meet the demands. Federal subsidies made to nursing schools, in order to permit them to take a larger number of students, have helped to some extent but not enough. Publicity and various local efforts to persuade young women to enter nursing schools have been only partially successful and there still remains as a bleak outlook a probable shortage of nursing care before the war comes to a close.

"This lack of success inclines one to wonder if possibly nursing is still cruising on the fat white ocean-liner of peace rather than driving forward on the lean ship-of-war. Today, the recruiting of man and woman power is highly competitive, and success appears to depend upon how completely the opportunities offered meet the psychological demands and the income necessities of those to whom the appeal is directed. There seems no likelihood that the WAACS and the WAVES will be unable, in spite of high standards, to fill their ranks with ease. And why? Because they offer to young women the opportunity of entering immediately into a service which is recognized as an integral part of the military effort. They pay her while she is being trained, and most of all they put her into a snappy, and official military uniform, which indicates to relatives, friends, acquaintances, and photographers that she belongs; that she occupies a glamorous place in the national war effort. As against this, the recruitment of students for nursing schools stands not much chance. It is essentially on the negative side. The high school graduate and young college-woman is approached on the basis of local hospital needs, or at least largely in terms of civilian needs. She is asked to undertake a course of training of nearly three years, during which time she sinks into anonymity so far as the war is concerned, and, except for her

board and keep, is expected to do this for nothing, which frequently she cannot afford to do.

"In the circumstances, might it not be well to consider making the appeal for student nurses on a realistic basis. Might it not be worth while, over and above routine recruitment for local needs, to consider the establishment of a WA—Corps for student nurses enrolled for future service with the Army or Navy. If such a corps were established, put in an off duty, official military uniform designed by a topflight coutourier, if that corps were disciplined to an alert esprit, detailed to regular nursing schools for training, paid as other students undergoing military training are paid—if these things were done and supported with national publicity, it is quite possible that the whole picture would change overnight. Another possibility to be considered, too, in spite of the fact that it will strike horror into the hearts of some of the leaders of nursing, is that perhaps in addition to commissioned nurses, there should evolve for military purposes a new type of Nurse's Aide, to become, possibly, sergeants in the nurse corps, *Military Nurses*, who conceivably could be given nurse's training rather than nurse's education, and who might complete such training in a time much shorter than that now required for the graduate nurse."

The Bolton-Bailey Act recently passed by Congress provides many of the elements recommended above. A Student War Nursing Reserve is set up in the Public Health Service (it is unfortunate that the initials do not spell anything); a uniform is to be provided and the student will be paid a stipend. It is on the latter point that we are apprehensive. According to an announcement in the June 11 issue of the *Public Health Reports*, this stipend will begin around \$15 a month and terminate at an amount not less than \$30 a month. It is difficult to understand why it must be so low. There seems to be nothing in the Constitution of the United States that makes it illegal to pay student nurses on a basis equal to that paid other students in training for war work. In medicine there are many applicants for each opening in a medical school and the student-soldier gets room and board and \$50 a month. In nursing where the number of applicants is alarmingly scant, it is not likely that \$15 to \$30 a month will stand up against the competition of business and industry or the intriguing military services which young women have a chance to enter. The mere fact that the United States of America sets such a low rate of pay for the student War Nursing Reserve is more than likely to cause young women to regard it as correspondingly less important than the other services.

And now, one final word to the Surgeon General: Dr. Parran, you watch your step about that uniform! If this matter were male and epidemiological, suggestions would be superfluous. But it is neither of those things. On the contrary, it is so female that it is ethereal—an ethereal salt of glycerol, the principal ingredient of dynamite. In handling this stuff you will need advice, and how you will need it. The consultant you want, however, is not in your Service, has no honorary degrees. The address is Fifth Avenue.

LETTER TO THE EDITOR

ALTHOUGH the discussion of H. M. C. Luykx' letter which appeared in the April issue of the JOURNAL aroused a good deal of interest, it was not planned to publish any further comments on the subject. However, on receipt of the communication presented below, the Editor changed his mind, for the point which Dr. Lumsden makes is of the nature of a basic principle, and to the general effect that a biostatistical chain is no stronger than its weakest epidemiological link.

TO THE EDITOR:

The outbreak of letters to the Editor appearing in the April and May (1943) issues of the JOURNAL regarding the application of statistical technics or methodology to some figures in an article on The Incubation Period in Epidemic Poliomyelitis, by Dr. Albert E. Casey, in the *J.A.M.A.* (120, 11: 805) of November 14, 1942, seems to warrant a letter to the Editor on the practical aspect of the basic matter.

To working epidemiologists and others in public health practice it is of no practical importance whether the \pm or standard deviation or probable error in the mean or average incubation period, as calculated by Dr. Casey apparently on a speculative or at most a hypothetical basis, was 1.6 or 1.1 or more or less or whatever, if any. Dr. Casey does not know, and the means were not and are not at hand to determine, whether there were any truly secondary cases in the series. As is indicated by Dr. Casey in the first paragraph of his article, we do not know the mode or modes of spread of poliomyelitis infection. A later case among contacts of an earlier case does not mean necessarily that the infection has passed from the one to the other. It is barely possible that figuring incubation periods of poliomyelitis on a basis of exposure through personal contact is as erroneous as it would be to figure that of bubonic plague, malaria, or yellow fever on a similar basis. In intensive outbreaks in limited areas many strict coincidences having no real

bearing on the causation of the disease may be found and be built up into elaborate and, unfortunately, misleading hypotheses or even doctrines, by single-minded investigators.

To some of the observers, including myself, the most striking epidemiological feature of the outbreak of poliomyelitis occurring in Walker County, Ala., between the last part of June and the last of September, 1941, and reported by Dr. Casey, was the geographical distribution. A description of this feature has not yet appeared in the literature. In general, it was somewhat as follows:

Of the 130 cases reported in the county, with a population of about 65,000, over 80 per cent were in the southeast quarter of the county's area. The population of this quarter was about 18,000. Thus the incidence was over ten times as high in this quarter as that in the other three quarters of the county's area. In the southeast quarter the disease was concentrated and prevailed at a very high rate in the low-level river-valley areas of the towns of Cordova and Dora. The hill sections of these towns, comprising about one-third of the population of Cordova and two-thirds of that of Dora, remained exempt from the outbreak.

Poliomyelitis virus was reported (by Dr. John R. Paul and his coworkers) to have been recovered from flies captured in an insanitary privy in the heavily affected section of Cordova. The whole area of high or outbreak incidence in Walker County was within

ready range of fly-flight, bird-flight and rat-travel from Cordova or Dora. Along with the number of diagnosed and reported cases there should have been, according to the contentions of the "contagionists," a very much larger number of clinically undiagnosable but potentially infective abortive cases and carriers.

In view of the uncertainties as to the immediate sources of the infection in the situation, the undertaking to figure the average incubation period from the

recorded histories of personal contact between diagnosed cases appears adventurous; and the statistical discussion of the figuring, though interesting and in a way illuminating, seems of only academic importance.

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JOURNALS WANTED

Readers are asked to address spare copies of the January, 1942, and March, 1943, issues of the *American Journal of Public Health* to the offices of the Association, where they will be most welcome.

Proposed Report on the Educational Qualifications of Health Educators*

I. THE GENERAL SCOPE OF HEALTH EDUCATION

The health educator assists in helping people to become intelligently aware of individual and community health problems and to share the responsibility for their solution. He interprets health needs, desirable health behavior, and the services of professional health agencies. Successful health education can rarely be accomplished by the use of publicity technics alone. It almost always includes the development of satisfactory learning experiences within organized groups and the training of other public health personnel to aid them in improving the educational opportunities presented by their contacts with individuals.

Health education is rapidly becoming recognized as one of the important fields of service in the modern public health movement. The emphasis upon health education and the demand for professionally trained health educators are increasing. We are without accurate data on the number of health educators now employed in the United States. It is estimated that there are probably four hundred to five hundred, exclusive of teachers of health in public schools and institutions of higher learning. Increasing consideration is being given to the organization of unified, community-

wide programs. Thus, promotional progress may be anticipated by the beginning health educator, both through the expansion of his program and through transfer to the service of larger population groups, as his ability is demonstrated.

The health educator in the health department works under the administrative leadership and direction of the health officer. The health educator working in the school system as a teacher, supervisor, or consultant, is a member of the staff of the school and will, of course, meet whatever professional educational standards are set by the school for the type of work involved. Health educators may be employed jointly by health departments and school systems. They are also employed by voluntary agencies. The educational qualifications of a health educator, whether employed by a governmental or by a voluntary agency, should meet generally accepted standards.

This report proposes desirable areas of competence for the health educator, based upon the functions which he is expected to perform. The recommendations are made for the guidance both of officials responsible for the appointment of health educators and of individuals looking forward to careers in health education. The professional standing of persons now performing creditable service as health educators has been established. Successful experience and demonstrated ability should be recognized at the present time as evidence of professional qualification.

* The Committee on Professional Education of the A.P.H.A. publishes this report before transmittal to the Governing Council in order to permit the members and Fellows of the Association to review it and to offer criticisms and suggestions in the further consideration of the report.

This report, like all other statements of the committee on professional and technical qualifications in public health, is subject to periodic revision in order that it may be kept abreast of the best thought.

II. THE FUNCTIONS OF HEALTH EDUCATORS

The following functions are believed to be essential for carrying out complete community-wide programs in health education. Such programs include health education in the schools and health education with the general public. It is recognized that there is an increasingly close relationship between these two phases of health education. Health educators in various positions will be expected to undertake some or all of the following functions or activities which involve the formulation of plans and methods, the application of specific technics and skills, the supervision of the work of others, and the maintenance of group relations. A job analysis of existing positions reveals wide variations in their scope.

The functions of health educators in community-wide programs of health education are:

In accordance with the administrative policy of the health department or other employing agency:

1. To be responsible for assistance in planning and organizing a program of health education of suitable scope and activities to meet adequately the needs of the community, state, or area to be served. This includes at the outset a study or survey of the needs, the determination of health problems which may be solved, at least in part, by the educational process, and an appraisal of resources.
2. To assist the community in organizing itself to find and solve its health problems.
3. To assist in establishing and maintaining close coöperative working relationships between all agencies (official and nonofficial) which may contribute to health education.
4. To aid in the planning, development, and conduct of training programs for employed personnel, in accordance with the policy of the agency involved, for (a) health agency personnel, (b) school personnel, and (c) personnel of other agencies.

Nearly all public health personnel have important educational opportunities. To increase the effective use of these opportunities is an important function of health education leadership.

5. To give aid in accordance with the policy of the institution concerned, in planning the health education aspects of pre-service training programs for professional personnel, including (a) public health personnel, (b) school personnel, and (c) others.
6. To provide consultation and guidance to various individuals and groups (such as Parent Teacher Associations, service clubs, and others) in developing and improving their health education activities.
7. To assist in promoting, organizing, and guiding study programs in the field of health for adult and group-work agencies, such as divisions of adult education, Young Men's Christian Associations, and similar groups.
8. To contribute to the improvement of the quality of the health education of the school child in accordance with the standards and policies of the school system.
 - a. Through aid in planning school health programs and curricula of health instruction
 - b. Through conferences with teachers, supervisors, and school administrators
 - c. Through such other activities as the school may desire
9. To organize and operate an informational service to provide answers to inquiries and to supply source materials and source references in answer to requests.
10. To be responsible for the preparation, selection, assembly, and distribution of health education materials, using the services of special technicians and health experts as necessary. Such materials include:
 - a. Reports and other printed materials
 - b. Visual aids, such as motion pictures, photographs, graphic materials, exhibits, and posters
 - c. News releases
11. To organize and assist in conducting a speakers' bureau, conferences, meetings, and radio programs.
12. To see that there is established a program of continuing appraisal of health education methods and materials in order to evaluate the effectiveness of health education procedures.

III. BROAD EDUCATIONAL BACKGROUND

The procedure used in determining the educational qualifications here listed, was to analyze each of the above

functions in terms of needed professional qualifications and to group these qualifications in suitable areas.

Certain facts should be borne in mind in approaching this discussion. Not all positions in health education, as indicated above, are of the same scope. The health officer or other appointing authority may not deem it necessary to require all the qualifications listed below for every position. They are the qualifications believed desirable for the director of a large and complete program. Nevertheless it is believed that the continuing improvement in the training of health educators will provide more and more workers who have this training, and that such a person will eventually prove most useful.

Experts in various technics who are not health educators are commonly needed to assist in editorial work and in the development of films, exhibits, and other graphic materials. The health educator concerned with the production of such material will know the nature, limitations, and possibilities of the processes involved. He will know how to work effectively with printers, motion picture producers, and other specialists. This report does not consider the qualifications of these technical experts.

It is clear that the health educator will be helped by broad cultural background and by a knowledge of (a) the structure, functions, and care of the body, elements of the commoner pathologic processes and elements of epidemiology in its broadest sense; (b) motivation and behavior in human life; (c) society as it is constituted—social forces and their control; (d) forces which affect living—environment and economics; (e) the scientific method in approaching the process of living, distinguishing science from pseudo-science; and (f) the processes of education—why we learn and how we learn.

There is also need for knowledge and skills which are more specifically professional in nature. The division between essentially basic preparation and strictly professional training cannot be readily drawn. Neither is it feasible to indicate here a specific training program in terms of institutions to be attended, degree secured, years of study or specific courses taken.

Some health educators have begun training for this field immediately upon reaching the university level. More will do so in the future. At the same time it is recognized that many of the professional fields in the health and social sciences, including education, contain many of the elements of training which are desirable for the health educator. Many successful health educators have acquired their training through supplementing the training in one of these professional fields by study in those previously omitted areas of knowledge which are required for health education. It is not feasible to discuss here the entrance into health education from various professional fields. We shall not attempt to define optimal training. We shall attempt to state the essential qualifications.

Present requirements in the training of health educators should be sufficiently flexible to be adapted to the scope of work required from the individual in question. Without attempting to indicate subjects of instruction or the division between fundamental and professional study, and based upon the duties to be performed in a complete program of health education, there is listed below the areas of knowledge and skill considered desirable for professional competence in health education. Well known areas of knowledge are listed in brief, general terms, while some of the specific skills needed are listed in more detail.

Desirable qualifications are:

1. Basic cultural education, including the de-

velopment of appreciations and skills in the use of the English language

2. Basic science education, including physics, chemistry, biology, anatomy, physiology, and bacteriology
3. Training in education and educational psychology to provide a knowledge of and functional experiences with
 - a. The nature of the learning process, involving individual psychology, interests and reactions, and indirect as well as direct learnings
 - b. The principles and practices of education
 - c. Methods and possibilities of adult education
 - d. The nature of the school health program, including health services, physical education, and other activities
 - e. Methods of educational evaluation and their possibilities and limitations in respect to the evaluation of health education programs
 - f. Curricula and curriculum development in public schools and in schools of higher learning
 - g. Educational supervision and administration
 - h. Existing practices and viewpoints of professional groups for which in-service training is provided, and recent trends in their education
 - i. How to organize and conduct field training for students at the pre-service level (in the case of a field station for professional training)
4. Social science education to provide an appreciation of the importance of respect for human personality and a knowledge of
 - a. Racial, social and cultural characteristics of the people and their mores
 - b. The significance of the economic status of population groups
5. Education in the field of hygiene and public health to provide a knowledge of
 - a. Physiologic hygiene, including personal hygiene, nutrition and mental hygiene
 - b. Environmental sanitation
 - c. Basic principles in the organization and administration of public health
 - d. Methods of communicable disease control, including the nature of the causative organisms and methods of transmission
 - e. Public health statistics and principles of statistical reliability
 - f. Survey methods
 - g. Relative importance of health problems and mode of attack

6. Training in the area of public administration to provide a knowledge of
 - a. Governmental and community organization
 - b. Community agencies, their functions, aims and interests
 - c. Technics for the successful interview and consultative conference (particularly in public school work)
 - d. The qualities of leadership, how to discover leaders and how to work with them
 - e. Group-work methods
 - f. Principles of planning
7. Training in special skills required in health education to include ability in public speaking and the conduct of public meetings and knowledge of
 - a. Methods and materials in health education, their possibilities, and limitations
 - b. The evaluation of sources of material and information
 - c. How to write informative and friendly letters
 - d. How to compile bibliographies
 - e. Filing and clipping methods
 - f. How to write and edit material for publication
 - g. The nature of the printing and duplicating processes and their use
 - h. How to distribute educational material effectively
 - i. The nature, preparation, and use of visual aids
 - j. Possibilities of community participation in the development of educational material
 - k. Press relations and technics
 - l. Radio methods and technics
 - m. Conference technics
 - n. How to organize, advertise, and conduct meetings

Carefully planned and supervised field experience and "internship" should be regarded as an important element in the training of the health educator and in the development of skill and ability in the field of health education.

Personal Qualities

A candidate for a position as health educator should possess such personal characteristics as creative ability, lead-

ership, good personal health, good judgment, pleasing personal appearance, common sense, and adaptability. Such important characteristics, along with the ability to work with people, the ability to size up and meet situations, and the ability to present pertinent facts simply and effectively, are not guaranteed by academic records in formal courses of instruction. The health practices of the health educator himself are also important.

Length of the Training Period

If one were to enter upon a program of planned study in the first year of university life, this essential training could not be secured, we believe, in less than 5 years. Study beyond this point would probably be desirable, especially for those aiming for positions of larger responsibility.

If such a 5 year program were followed, the essential basic preparation could be obtained by a 4 years' course leading to a Bachelor's degree with major emphasis upon: (1) the basic health sciences, (2) education, with emphasis upon educational psychology, and (3) the social sciences.

In such a case, the graduate work would include supplementary courses in the above and allied fields, courses to give a working knowledge of the public health program and its operation, and courses in health education, plus supervised field training wherever pos-

sible. The content and extent of the graduate work required would vary according to the amount of undergraduate preparation and the interval between undergraduate and graduate study and the quality and type of experience the individual has had.

The Place for Graduate Training

It is recommended that programs of professional study in health education be offered in those institutions which are providing professional education in other fields of public health, and which have available the required instructional facilities. Field training stations are desirable.

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"IMPRESSIONS OF AMERICA"

"Report of W. M. Frazer, O.B.E., M.D., M.Sc., D.P.H., Barrister-at-Law, Medical Officer of Health of the City of Liverpool, containing his Impressions of America After His Recent Visit" will bring modest, humorous, attentive Dr. Fraser pleasantly to the minds of many who had the privilege of adding to his "impressions" when he visited the United States last fall.

A reading of his report, which occupies 28 pages, underlines again the truth that "He who bring home the wealth of the Indies must carry the wealth of the Indies with him. So it is in travelling. He who would bring home knowledge must carry knowledge with him."

Dr. Frazer discusses our geography and our demography, the governmental system, health department organization, social conditions, general education, medical education and research, public health, hospitals, hotels, railways, war attitudes, and much more. It is all astutely appreciative.

Some samples of Dr. Frazer's "Impressions":

In the United States highly favourable living conditions have been created as a consequence of the conquest of a large and richly endowed territory during the past 150 years. The success of the Americans in bringing under man's control in this comparatively short space of time a vast country possessing such diversified geographical features and such abundant natural resources is one of the miracles of history. But this triumph over nature has given to the average American the highest standard of living ever enjoyed in any large community and in any age, and his genius for political and social organisation has produced the American way of life—a phrase hard to explain because it is a mixture of many things, of business, high spirits, sport both amateur and professional, comfortable houses with central heating, and

every imaginable "gadget," the hire purchase system, the cheap and very efficient car which is the open sesame to the kind of life the American likes to lead, the country club, iced water at every meal, palatial hotels in most cities, and places of amusement everywhere. Most of these things are good, but a recital of them does not tell the whole story about the attitude of the typical American towards life. It is not quite as materialistic an attitude as it appears at first sight. There is another and equally important side to it. Americans are interested in education, literature and art. Their interest in education has produced a system of primary schools, high schools, colleges and universities which—at least in the larger centres of population—give opportunities unsurpassed anywhere in the world to boys and girls with ability to climb the highest rungs of the educational ladder. There are universities and other centres of higher education in every state and almost every city—even the smallest. Some of these institutions may fall below British standards (although many are highly efficient) but they strive to keep abreast of the times, they experiment and they are not afraid to scrap what they have done and to try again. Americans are accustomed to pioneering conditions in regard to many aspects of life and they are used to taking risks both in their business and public affairs. I was fortunate in being able to see something of the higher educational system as I had the opportunity of visiting the Universities of Harvard, Columbia in New York, St. Louis, Chicago, Buffalo, Boston and Toronto. These universities, mainly great city universities are excellently staffed and magnificently housed and equipped and their standard of teaching and research is as high as in corresponding institutions in this country.

Some of the features in the public health system in Great Britain are frankly needed owing to poverty or at least to the relatively low standard of living: in a country with a high standard of real wages like the United States comparatively few persons require assistance of this kind except during the rare periods of industrial depression. One favourable circumstance in regard to the health of the community is that American towns are not so congested with buildings as

in this country—streets are wider, there is much more open space and there is practically no smoke in the atmosphere even in the most highly industrialised cities. The last-named feature appears to me to be of great importance. No person who has not visited the United States and lived in its clean and wholesome urban areas can appreciate the enormous damage which the almost uncontrolled emission of smoke into the atmosphere does in this country—damage to health, to buildings and to furnishings and clothes. Heating in American buildings, both domestic and commercial, is almost universally central heating by oil, gas, electricity or steam relayed from centrally-situated depots. As one result of the clean atmosphere of American cities the incidence of respiratory diseases both in adults and children is very low. This is part of the explanation of the extremely low infantile mortality rate in such highly-industrialised cities as Chicago (28.8) and Detroit (30). When one considers the high infantile mortality rates in Liverpool (82 in 1942) and other English industrial areas, the corresponding figures for some American cities appear almost unbelievable, especially as birth-rates there are usually higher than in this country.

I have already indicated that the emphasis in connection with public health problems is often differently placed in the United States than in this country. Immunisation against diphtheria is there taken very seriously, and in almost every large American city a very high percentage of children (in some cases approaching 100%) are so immunised. In estimating the value of this work in reducing the incidence of diphtheria epidemiological considerations such as secular variations in the prevalence of this disease and the mild type of organism responsible for it have to be taken into account, but, nevertheless, hygienists in the United States ascribe the fall to nearly vanishing point in the incidence of diphtheria, in some areas, almost entirely to the wholesale immunisation of the child population.

Legislation in the United States on the subject of milk supply, although it varies somewhat in the different States, is, on the whole, more drastic and more effectively administered than in Great Britain. Perhaps, in one way at least, their problem is a simpler one since the amount of tuberculosis in cattle has always been much less in the States than in this country. During recent years a campaign for the eradication of tuber-

culous cows throughout the whole country has been undertaken. . . . So successful has it been that a very large percentage of all milch cows in the United States of America are tuberculin tested, and there are now relatively few reactors. To make assurance doubly sure, milk from tuberculin-tested cows is also pasteurized and bottled so that the risk of contamination on the way from the cow to the consumer is avoided. Partly because of the safety of the supplies, but, no doubt, partly because of its value as a food, milk is highly popular in the United States, and the consumption per head of the population is far higher than it is in this country, averaging about a pint per person per day. It would cause no surprise whatever in an American restaurant or hotel if one asked for a glass of milk at dinner instead of coffee—quite a number of other people will be doing the same.

A word or two about the American war effort and their attitude towards the war. I found nobody amongst the hundreds of people of all types that I met who was not heart and soul in favour of the most energetic prosecution of the war until complete victory crowns our joint efforts; and although there is a little grumbling, as there was in this country, when some of the comforts of life are taken away, this is merely a superficial reaction which does not reduce in the slightest the stern resolve of the American nation that this threat to the way of life of the democratic countries shall never occur again.

NEW ITEMS FOR YOUR SAFETY PORTFOLIO

A "Safety Guide for the Farm and Home Front" is available through the Department of Public Services, General Mills, Inc., Minneapolis, Minn. Check lists under such headings as "What Are the Danger Spots on Our Farm?" "Danger Spots in the Barn and Barnyard—Where Are They?" "Is Your Home a Haven of Safety?" are intended to engage the participation of the whole family in a program of accident prevention. The booklet is designed for members of rural youth groups and their leaders, including, of course, teachers.

J. R. Williams, famous cartoonist

whose series entitled "Out Our Way" appears in newspapers all over the country, is doing 12 poster cartoons for the Division of Inspection and Accident Prevention of the Maryland Casualty Company, Baltimore, Md. The first has been distributed; others will follow from month to month. Black and white, size 11" x 14", the June cartoon is entitled "The Hard Way." It depicts a workman watching the overalls just ripped from him, as he oiled moving machinery, twist and turn, while a wise foreman keeps the machine running to give the oiler a realistic lesson in what his carelessness might have done to him.

Safety material can further be supplemented by "Safety Speeds Production," a message directed to supervisors, for which the Division of Labor Standards, U. S. Department of Labor, Washington, D. C., is responsible. While it is for the use of foremen and others in large war plants, much of it is applicable to any work-place, large or small. Two pages answering the question "What are some good house-keeping aids?" present a partial checklist of simple precautions in work-places so obvious they may easily be overlooked.

And of course you know about the American Safety Standards published by the American Standards Association, 29 West 39th St., New York, N. Y. They include industrial and school lighting, safety code for industrial sanitation, and safety rules and codes for all manner of manufacturing operations. The *List of American Standards for 1943*, of which the section on safety is a part, will be sent free of charge by the A.S.A. Standards approved by the A.S.A. represent general agreement of all interested groups. The American Public Health Association has had a part in the formulation of some of the standards listed and is participating currently in the revision or preparation

of others. (See pages 287 and 288 of the March JOURNAL.)

DON'T ADDRESS MARY P. CONNOLLY AT
DETROIT ANY MORE!

It will be hard to remember, but since June 1 Mary P. Connolly's permanent address has been Dushore, Pa. She has completed 25 years of service with the Detroit Health Department and has done what she said she would do—retire. She gives up her post as Director of the Bureau of Health Education of the Detroit Department of Health, which she has occupied since 1921, but not her interest in the specialty with which her name has become synonymous. After her Victory Garden has been harvested at Dushore, Miss Connolly will spend part of her time in Ann Arbor, teaching Community Health Organization in the School of Public Health.

Miss Connolly began her public health career as a nurse in the Detroit Health Department, after graduating from the St. Agnes Hospital, Philadelphia. At that time Detroit with its meager health facilities was struggling with an epidemic of influenza and the problems of the war industries. After three years with the nursing division, she was made Director of the Bureau of Health Education and has developed this service into its present far-reaching community-wide program which carries the message of good health to all Detroit citizens. The personnel of the bureau has increased from one in 1921 to fifteen in 1943, and has an annual appropriation for salaries alone of nearly \$50,000. During these 25 years the Health Department has grown from a small organization of a few hundred employees to one which now commands the services of 2,200 individuals and spends annually four million dollars of tax money. The phenomenal reductions in the death rates from preventable causes and the reduction of the

crude rate for Detroit to the lowest among the larger cities of the world, is due in no small measure to the seeds of health education sown by Miss Connolly and her small staff of trained workers.

In addition to her degree in nursing, Miss Connolly has received the Master of Science from the University of Detroit. For 20 years she was a non-resident lecturer in the field of health education at the University of Michigan, and of late years she has been, as well, special lecturer in health education at Wayne University. She served for six years as a member of the Governing Council of the Association; five years as Secretary of the Section on Health Education; one year as Chairman of this Section. She is now a member of the Section Council.

Her name on the faculty list of the several Health Education Institutes sponsored by the Association at Annual Meetings has been responsible for many an enrollment among those, and their name is legion, who know that anything she is connected with will be worth while.

CREDIT LINES Salutes Miss Connolly and her work of the past 25 years. It holds in reserve another accolade, sure to be conferred later, for what she will do in the future.

TRIBUTE TO HEALTH EDUCATION FROM AN UNEXPECTED SOURCE

Visual evidences of the effects of all the health education that has been done in this country are many, we think, as we admire individual and collective members of the younger generation. When we were seventeen, were our backs and legs so straight, our teeth so gleaming white, our hair so shining with cleanliness and health? Any group of twenty high school youngsters today could give a similar group of let's say twenty-five years ago cards and spades. The way they dress now has something to do with it, of course, but

what the clothes adorn or what adorns the clothes, appears to be better material, esthetically speaking, than what we had to offer.

There is clinical evidence as well that health education has taken hold. An interesting bit comes from Dr. Frank E. Adair, Associate Professor of Clinical Medicine at Cornell University Medical College and guiding genius of the American College of Surgeons' register of cured cancer cases. Says Dr. Adair:

Education of the public in the matter of cancer control is definitely going ahead. A clinical sign which supports this statement is the size of the cancers operated on today as compared with those that came to the operating table fifteen to twenty years ago.

Dr. Adair prophesies that the teaching of the subject of cancer in connection with the biological study of growth in the secondary school systems of Westchester County and in certain parts of the New York City school system will undoubtedly save the lives of many people. It undoubtedly will, but that is for the future.

The majority of the patients who are presently bringing early and small cancers to Dr. Adair's attention are certainly not the members of the younger generation we have been eulogizing and who are now being taught about the proliferating cell. They are the high school students of fifteen and twenty years ago who got their education in health the hard way, without benefit of classroom instruction from kindergarten on, without benefit of the solicitous care they, as parents, are giving their young today. That is what makes this report from experience so encouraging.

If we didn't have our quart of milk a day while we were growing up, if our wintertime citrus fruit intake was limited to the Christmas orange in the toe of the stocking, if our doctors never saw us except when we were flat on our

backs in bed, nevertheless we of this older generation have been exposed to health education somewhere along the line and are applying to ourselves and to our children what we have learned.

DR. GREGG ON SPEAKING AND WRITING

It is good to know that Captain John Lentz of "Credit-Lines" fame still keeps his appetite for literary caviar and has the opportunity now and then for satisfying it. Recently he sent one of his erstwhile associates, who reconciles herself to the day by an early morning dip into "the literature," the commencement address delivered by Dr. Alan Gregg, Director of the Medical Sciences of the Rockefeller Foundation, at The Jefferson Medical College on March 4, 1943. This address entitled "Language and the Practice of Medicine" was printed in *The Diplomat* for April.

Some of Dr. Gregg's remarks to fledgling doctors may prove interesting to their more experienced colleagues:

On being understandable to one's patients: "For four years you have considered important the opinion of medical men. Now you will have to reckon with the opinion of laymen. Can they understand their doctor? . . . They will be uneasy and perhaps resentful if you aren't a master of simple exposition and plain narrative about things they do not understand and yet may wisely fear."

On current performance in the art of medical and scientific writing: "The common level of medical and scientific writing in our professional books and journals already constitutes the most serious internal limitation to medical education and research. The usual level of professional writing is painful not merely to editors. Even after passing editorial filters, the virus of wretched writing can inflame, insult, and exhaust a clear-minded man . . . even with the benefit of hours of edi-

torial improvement, the medical literature of today exemplifies all too fully the biological adage that life is choked by its own secretions."

On "the unreflecting use of adjectives and adverbs": "Adjectives, like certain antigens, develop their own antibodies."

To those who "think it is too late to learn to use words effectively": ". . . Unnecessary humility endorses needless resignation. Instead of giving up now, you could better admit that *mastery of words comes slowly because language demands, like every beautiful instrument, long practice and discriminating use.* Language cannot take the place of thought, or of action, or of listening, but 'that one Talent which is death to hide' cannot be neglected by those who must lead their fellow men."

NEWSPAPER SUPPORT, MICHIGAN STYLE

H. E. Miller, Resident Lecturer in Public Health Engineering, University of Michigan, sends an editorial published in *The Ann Arbor News* for May 13 which is worth quoting in full. Mr. Miller tells us that the course referred to was one on basic sanitation, designed to prepare these "sub-sanitarians" for the replacement of trained sanitarians in Michigan health units who have been commissioned in the Army.

Mr. Miller's comments on the editorial are worth quoting, too. He says:

In this editorial, an understanding of the relationship that the public health engineering section bears to the school as a whole, and its essential functions in the overall structure of the school is set forth in a way that is frequently not visualised by even well informed public health authorities. The fact that it was uninspired and unexpected, but purely the expression of a newspaper man lends hope to the thought that public health may be accomplishing more than is realized in ways of developing a better general understanding and appreciation of its efforts.

This is the editorial:

DEDICATED TO PUBLIC HEALTH

Completion of a course in public health engineering by 16 men from various cities of Michigan, who now will be known as "sub-sanitarians," accepting positions of responsibility in their home communities, offers a glimpse into the future of services of a highly practicable nature by the University's School of Public Health.

This school soon will occupy its new building on Observatory St., bringing together for the first time its offices, laboratories and staffs, engaging in varied activities but now scattered about the campus.

That name, School of Public Health, indicates the practical purposes to be served. And the experiences of the handful of "sub-sanitarians" offer just a glimpse of those purposes.

The 16 will take the places in community health departments of sanitarians who have gone into the armed services. They will aid public health physicians in safeguarding municipalities against epidemics. They have learned how to do this at the School of Public Health, though their instruction covered only three weeks. Now they will have "field work," rounding out the practicability of their training, at the Kellogg Foundation, with headquarters in Battle Creek. They will hold their new position for "the duration."

They did not receive their training primarily at the hands of doctors of medicine. The staff members with whom they came into contact were, mainly, public health engineers, with knowledge based on experience, as well as theory, in the business of maintaining vigilance against the inroads of disease—by inspecting eating places and dairy herds, by controlling insects and rodents, by avoiding water contamination, etc.

But there will be doctors of medicine in the School of Public Health, and there will be intense research into a number of human ills, including some of the most serious, such as malaria, infantile paralysis and influenza. Mosquitoes will be bred for experimental purposes; so will bacteria, of both the harmful and harmless kinds. One experiment now under way in one aspect of water contamination, in the engineering department of the school, offers some prospect of offering a new field of research into the cause and possible cure of some human maladies. In this connection, the housing of the public health engineers and medical research workers under

the same roof will operate for mutual benefit and the public good.

Every phase of public health work will be dealt with in the school—under that same roof. Physicians will be especially trained for public health work; so will other workers in health departments, including the sanitarians—and there will be all those researchers at work—in close proximity, with collaboration made convenient. In other words, several different but related branches of science will be meshed together in a kind of investigating mechanism with the same general objective in view—to keep the public well.

This is an ideal situation. In the past, there has been too much independent research by various branches of science. Medicine and dentistry seldom got together, for example, though they serve common purposes and have overlapping interests. Lately, medicine and chemistry have held closer communion, because of the biochemical drugs coming into widespread use. In the School of Public Health, with well equipped laboratories and highly trained staffs, dealing with separate factors in human problems, but with the same general over-all problem in mind, there will be opportunities for the much-desired collaboration that never before have been presented.

Out of the engineering laboratory may come the clue that will lead to medical research of great value. The investigators in the parasitic disease laboratory are likely to make various discoveries beneficial in the field of public health engineering. The laboratories are separate, but inter-communication is easy in the new home of the school. And out of this school will be a steady flow of students with the knowledge and the training needed to serve the people as guardians of health in a variety of ways.

The formal opening of the School of Public Health, in the near future, will be an important public event. It is not "just another" building dedicated to academic learning. It is dedicated to the purpose of improving ways and means, on a large scale, to keep humanity well. And, considering the equipment in the way of absolutely top-notch personnel and the best in the way of research and teaching equipment that can be produced, the prospect looks very bright. It appears safe to predict that Michigan's School of Public Health will be recognized ere long as one of the great institutions of America, if not of the world.

BOOKS AND REPORTS

Public Health in Manitoba—1941
—*A Report of a Study Made by the American Public Health Association, New York, 1942. 147 pp.*

The study of public health administration in Manitoba is a comprehensive one, which is interspersed on almost every page with recommendations in large type. The report is particularly interesting because the Canadian forms of federal and provincial government and health administration are so different from their counterparts in the United States. The national health authority is the Dominion Department of Pensions and National Health, and in the province it is the Manitoba Department of Health and Public Welfare. Of the latter the titular head is the Minister of Health and Public Welfare who must be a member of the Legislative Assembly of the province. He is responsible for all important decisions of policy and in 1941 was the Attorney General of Manitoba. To his Deputy Minister, who must be a professionally trained medical officer of health, he delegates the direction of the department.

The record is one of much administrative confusion, a need for reorganization, and indeed even a desire for guidance in the matter. The province, chiefly rural and agricultural, has a population of about 700,000. Of this figure roughly 250,000 are in Winnipeg, the largest city. The next center in size, Brandon, is a city of 16,000 persons.

It is reported that the Deputy Minister is an extraordinarily capable leader and administrator, who is able to accomplish much with very limited staff and funds. It is obvious that all

the salaries for professionally trained people are shamefully low.

The study deals particularly with the problems of rural Manitoba, excluding Winnipeg. An outstanding need is for many more full-time local health units. There are only four, three of which are in Winnipeg and its suburbs. The four serve 39 per cent of the total population of the province. The rest is in the hands of 170 part-time medical health officers all but 16 of whom, the so-called municipal doctors, earn their chief livelihood in the private practice of medicine. One cure would seem to be a much more liberal financial grant from the Department of Pensions and National Health at Ottawa. Another vital lesson for the farmer population to learn is that generous investments in public health appropriations can yield worth while dividends in human happiness.

The rather overwhelming administrative and budgetary matters of medical and mental care, including hospital services and difficult abuses in hospital admissions, the public welfare program, and the voluntary or semi-governmental control of tuberculosis, add complication on complication that would stagger a state with completely organized full-time public health administration on the local level. It is no wonder then, that in describing the four full-time local health services the author's comment on one is as follows: "The health department at Brandon seems at present a less promising picture, principally because such a large proportion of the health officer's time is devoted to the medical care program."

HUNTINGTON WILLIAMS.

The Metabolic Cost of Maintaining a Standing Position. *With Special Reference to Body Alignment—By Harriet Graham McCormick.* New York: King's Crown Press (1145 Amsterdam Avenue), 1942. 75 pp. Price, \$1.25.

I find this book very challenging to me as an orthopedic surgeon interested in postural matters, but rather difficult to review because it is descriptive chiefly of all the technical detail of the experimental study. To one interested in clinical manifestations it is difficult to wade through so much tabulated material and then be left to draw one's own conclusions in order to apply the data to everyday needs.

The author's observation, that in the relaxed posture type with back knee, forward pelvis, flexed back and forward head, with minimal energy cost is apparently due to the stabilizing effect of ligamentous tension is probably correct. It should not, however, be the basis for the assumption that such a posture is all right or acceptable, because such continued tension and strain will gradually stretch and relax them, and the posture in time will become worse, thus promoting a vicious circle, which as years go by will tend to promote a wear and tear arthritis. Probably if continued the ultimate metabolic cost could be greater than the increased expenditure by the assumption habitually of the posture generally accepted as "good."

It seems to me that the minimal output of energy is not what is desirable, but rather an output which will maintain a reasonably good posture which will be efficient from the standpoint of health as well as improve the facility of coördinated function required for skilled performance and, as the author states, give the greatest satisfaction. In this I concur in the "implications" discussed on page 60, and will join the group desiring the best posture obtain-

able without too much strain, feeling that in the long run, when the habit is established and such a posture can be maintained more naturally, the metabolic expenditure will be less than shown by these experiments.

It would be of great interest to see the same experiment repeated on the same group after six months to a year of really guided and controlled correction of their postural faults.

C. L. LOWMAN

Democracy Means All of Us—How Communities Can Organize to Study and Meet Community Needs with Special Suggestions for Developing Nutrition Programs in Wartime. Federal Security Agency—Office of Defense Health & Welfare Services, Washington, 1942. 30 pp.

This pamphlet, which consists of 18 pages of text and 12 of appendix, can be helpful to the person interested in community organization. Although written to aid in the development of nutrition programs as part of community defense council activities, the principles of organization and procedure outlined apply to all types of community work.

Prepared by a group of outstanding experts in the field of nutrition, education, and public health, the pamphlet is of unusual interest, because the procedures advised and problems encountered in communities of various size are dramatized. Although brief, the booklet is surprisingly complete and can be recommended to both the lay and professional worker.

Particularly valuable is the emphasis on and suggestions for

1. Clearly defining objectives in the planning stage.
2. Reaching all the people—(hence the title, "Democracy Means All of Us").
3. Youth participation.
4. Evaluation. Too often evaluation is neglected or considered only after the opportunity to secure adequate data is passed, and

the authors clearly indicate the importance of considering evaluation during the planning period.

The appendix contains a good bibliography, organizational charts, a list of helpful organizations, suggested questions to assist in studying community problems and resources, and a form for nutrition studies.

W. R. WILLARD

Flying Men and Medicine—By E. Osmun Barr. New York: Funk and Wagnalls, 1943. 254 pp. Price, \$2.50.

The book is largely a discussion in lay language of the Civil Aeronautics Authority physical examination for flying. Such a subject makes dull reading at best. Physicians will not want to read it because it is too elementary; airmen will find it tedious and in some parts difficult to understand. It is not likely to put its message over to the prospective flyer for whom it was written.

Further, it seems undesirable that the applicant for flying training know too much about the physical requirements and the reasons for them. This has resulted in the circumvention of the requirements by subterfuge, and the unwitting medical acceptance of individuals for flying training with defects which are dangerous.

There are unusual statements, especially on the physiology of flight, which make it clear that the author is not intimate with some of the recent advances in this particular field.

There are several passages of unrestrained emotionality about flying, with change in tense, which one would expect of a less mature type of publication.

Throughout one gets the impression that the book was written, or at least conceived, quite some time ago and has been published now simply because of the renewed interest in aviation and aviation medicine.

The prospective flyer and the flying man of today will find it of limited value.

CHARLES E. KOSSMANN

Nutrition Programs for Industrial Employees (No. XIII). 8 pp. December, 1942. Price, \$.20.

The Medical Department in War Industries (XIV). 8 pp. December, 1942. Price, \$.10.

The Feeding of War Workers—A Selected Annotated Bibliography (No. 70). 15 pp. October, 1942. Price, \$.15.

Medical Service in Industry—A Selected Annotated Bibliography with Particular Reference to Health Programs in War Industries (No. 71). 11 pp. December, 1942. Price, \$.10.

Industrial Relations Section, Department of Economics and Social Institutions, Princeton University, Princeton, N. J.

Nutrition Programs for Industrial Employees—There is no subject in the field of public health which has attracted such wide attention from all groups in the population as has the subject of nutrition. It almost seems that over night we discovered that the American population was and is, in some respects, suffering from malnutrition.

The present pamphlet outlines the important aspects of the nutritional program for industrial employees. Naturally, in this brief space, only the over-all picture may be presented, but the present pamphlet is complete enough to give anyone interested in this subject an excellent knowledge of the fundamentals of the practical approach to its solution.

The Medical Department in War Industries—The present trend toward group medical practice and socialized medicine has led to the discovery of the importance of the medical department in industry as a nucleus for public

health and medical practice. As a consequence, the medical departments in industry have, in the last five years, grown tremendously in numbers and importance. The functions, both direct and indirect, of such medical departments are set forth in this very brief pamphlet in a topical form.

This is an excellent digest for use by those agencies interested in developing and fostering medical departments in industrial establishments since all of the fundamental factors are set forth in a brief and orderly presentation.

The Feeding of War Workers—To one desiring to make a rapid acquaintance with progress in the field of industrial nutrition, the present pamphlet is of interest and value. The bibliographic items selected by the writers are valuable, chiefly because of their succinct and objective presentation.

In general, the field has been fairly well covered but, of course, the subject of industrial nutrition can hardly well be presented in 15 pages.

Medical Services in Industry—This 11 page mimeographed leaflet makes no pretense at being complete but rather presents a selected bibliography of the subject of medical service in industry.

The subject matter is divided into five parts; general discussions, reports of service of company programs, reports and recommendations of medical associations, special problems and programs in small plants, and finally, industrial health service in war time.

Naturally such a brief pamphlet cannot make any pretense at completeness but the material presented is among the best in the field and is certainly suggestive for those wishing to make an immediate and rapid contact with the problem of medical services in industry.

LEONARD GREENBURG

Exploring the Dangerous Trades
—*The Autobiography of Alice Hamilton, M.D. With 8 illustrations by Noah*

Hamilton. Boston: Little, Brown, An Atlantic Monthly Press Book, 1943. 433 pp. Price, \$3.00.

Public health workers and others interested in the development of industrial hygiene in the United States will find this autobiography with its sociological, political, and philosophical observations particularly stimulating at this time of increased concern for the health of the worker. The author began her numerous and diverse field investigations in the pre-workmen's compensation days of 1910, when she cooperated in the study of occupational diseases in Illinois. Subsequently reference is made to federal surveys which included, among others, the investigation of high-explosive production, and the effect of the air hammer on the hands of stonecutters; to attendance at meetings abroad of the International Congress of Occupational Diseases and Accidents; and finally to the study in 1938 of carbon disulfide poisoning in the viscose rayon industry. Thus three decades of industrial hygiene are presented, an account which constitutes a valuable contribution to a history of the health of the American worker.

W. M. GAFARER

Nursing History in Brief—By Minnie Goodnow (2nd ed. rev.). Philadelphia. Saunders, 1943. 338 pp. Price, \$2.25.

The text is intended for schools of nursing giving "courses of fifteen hours or less" and includes "a short outline of facts of nursing history." These facts are broad in scope, going back to 1300 B.C. and extending down to the present time. Each chapter is concluded by means of a summary of important points to remember. The text contains 103 illustrations, largely reproductions of portraits. Chronological outlines of general history and of nursing history are also included. The influence of religious and military orders

on the development of nursing is mentioned.

The treatment of the subject of history is purely factual and not interpretive, and since the text must be a short one the facts are sketchily presented. For example, the development of public health nursing in tuberculosis, child care, school nursing, and industry is treated in one page only. There is nothing of the tremendous development of public health nursing in official agencies in rural areas—the most outstanding recent achievement in this field. Little is said of the political, social and economic factors in general history which have their counterpart in the development of nursing, not even the influence of the Social Security Act upon the education and distribution of nursing in the United States.

One might raise a number of questions as to what historical approaches will give the best results when a short intensive course must be given. Should the approach be factual or interpretive? Should the many facts be sketchily presented, or should they be selective and grouped around large central themes? Should the approach be functional rather than chronological—the outstanding problems of nursing today and some interpretation of how they evolved?

The usefulness of this text will be largely to those instructors, and there are many of them, whose approach is factual and chronological.

MARY ELLA CHAYER

Twenty Years of Medical Research—By Dorothy White Nicolson. New York: National Tuberculosis Association, 1943. 97 pp.

This is an account of the work and accomplishments of the Committee on Medical Research of the National Tuberculosis Association. The outstanding features of the work of this committee concern the nutrition and chem-

istry of the tubercle bacillus. This has resulted in the most complete analysis made of the organism, and the isolation of the active principle of old tuberculin—Purified Protein Derivative, known as PPD. This can be prepared from human, bovine or avian tubercle bacilli. In 1941 a large quantity of PPD was prepared for use in standardizing tuberculin, a project of the Health Committee of the League of Nations. The Carnegie Corporation furnished funds for purchase of a quantity which is in the custody of the U. S. Public Health Service until the war is over, when it will presumably be sent to Copenhagen where other standards are kept.

The fine work of Dr. Florence Seibert is well known. It has been recognized all over the world and she has been the recipient of the highest honors.

We wish it were possible to mention others of the various studies carried on and the names of the workers responsible for them.

The pamphlet gives also a list of the grants by the committee and a list of the organizations which have contributed financially to the work. There is a very valuable and complete bibliography extending from 1921 to 1942 inclusive.

The compilation of the entire book has been done by the secretary of the committee from its inception. The record is one of extensive research with some striking results. The National Tuberculosis Association is to be congratulated on its part in bringing about this work and the publication is a valuable one.

MAZÛCK P. RAVENEL

Primer of Allergy—By Warren T. Vaughan. St. Louis: Mosby, 1943. 176 pp. Price, \$1.75.

The demand for a second edition of the *Primer of Allergy* has fulfilled the prediction of the original reviewers that this little book would become popular. The object of this book as stated by

the author, is to impress upon the patient the need for a thorough understanding and coöperation in the problems presented to the physician by an allergic patient.

This story of allergy explains in a simple way the complex symptoms presented the physician in the majority of cases. Anyone who has read this book before consulting an allergist certainly should be able to understand the whole subject in a clearer light.

The subject matter is approached in a humorous and practical manner. The patient is encouraged to become aware of his own environment and its contributions to his especial case. One is surprised that so much good information can be given to the patient without going into real technical explanations. A much needed and timely explanation to the public on the subject of allergy is contributed by this book.

J. RICHARD ALLISON

An Evaluation of Dental Health Literature—*By Vern D. Irwin and Netta W. Wilson. Minneapolis: Bruce Publishing Co., 1942. 58 pp. Price, \$0.50.*

Courageous indeed were the authors of this booklet, for they have studied the "mistakes that have been made by many sincere and intelligent writers on this subject (dental health)."

To prove that laymen have been misled by "inaccurate, imprecise, contradictory, misleading, impractical, or over-technical" statements, 2,441 items from state health department publications, dental organization material, books, periodicals, and newspapers were analyzed.

How the authors attacked inaccuracies can be illustrated by the following:

Citing from a state department publication, "Refined foods may be used without harm so long as adequate amounts of the protective foods are utilized," the comment is made by the

writers that this opinion is "controversial, and directly opposed to those who present evidence showing that refined foods, especially refined sugars, may harm the teeth."

A chapter on Adaptation of Dental Health Literature will challenge and instruct the health educator no matter what his field may be.

The reviewer is convinced that hereafter before he thrusts reading material upon his public, he will carefully review Irwin's and Wilson's criticism and attempt to adopt their suggestions for the presentation of dental health education material.

With such thoughts is it surprising that your reviewer commends this work as one that will contribute to more realistic and effective dental programs?

J. M. WISAN

Understand Your Ulcer—A Manual for the Ulcer Patient. *By Burrill B. Crohn, M.D., F.A.C.P. New York: Sheridan House, 1943. 199 pp. Price, \$2.50.*

The author prepared this manual to be put into the hands of the patient suffering from gastric or duodenal ulcer. He states his specific purposes to be "to give you (the patient) an intelligent understanding of what your doctor says and what he means and so avoid many questions on your part. We aim to give you self-confidence and to allay your fear if you have any." The book scarcely succeeds in either of its purposes.

It devotes too much space to the details of symptoms, complications, treatment, both medical and surgical, including illustrations of operations and surgical devices. Overemphasis is placed upon the lack of specific cause of ulcers and the divergence of opinion among medical men as to treatment. This helps neither the patient nor the profession. One wishes that more attention had been given to the hygiene

of the digestive tract and an effort to provide mental hygiene guides for the patient. Part II contains specific information on preparation and cooking of diets recommended by the author.

WALTER H. BROWN

This Is My Life—By *Agnes Hunt*. New York: Putnam, 1942. 237 pp. Price, \$2.50.

The fact that these reminiscences are now reprinted for apparently the third time bears testimony to their charm, and perhaps one should first rejoice that the volume is at last available in an American edition. This tale of the brave descendant of Shropshire gentry who became so intimately connected with Robert Jones and modern efforts in the behalf of the orthopedically handicapped will appeal to more than one kind of reader. Certainly the child psychologist should find food for thought in the life of one whose early childhood seemed to lack every vestige of security and affection. Those interested in the physically handicapped, too, will find here a tale at which to marvel. And even the casual reader may find here a mixture of humor, courage, and mid-Victorianism which will please him.

LEONA BAUMGARTNER

Noxious Gases and the Principles of Respiration Influencing Their Action—By *Yandell Henderson and Howard W. Haggard*, 2nd ed., No. 35. New York: Reinhold Publishing Corporation. 287 pp. Price, \$3.50.

The authors of this book are well known for their researches in applied physiology and for their skillful exposition of both technical and general aspects of their field. It is not surprising, therefore, to find that the second edition of their standard treatise on "Noxious Gases" is a competent and readable survey of the subject.

Within its limits the book may be

highly recommended. However, it is important to recognize these limits, one of which is hinted in the full title—"Noxious Gases and the Principles of Respiration Influencing Their Action." Approximately a third of the book is devoted to a general discussion of respiration, and the book generally pays scant attention to skin irritants and non-respiratory pathology induced by noxious gases. The decision of the authors to restrict their attention to industrial aspects of the problem resulted in the omission of any treatment of the timely subject of poison gases in war. Phosgene is very briefly mentioned; "mustard gas" (dichlorethyl sulfide) is not discussed at all though it is listed in two tables.

There is a brief bibliography at the end of most of the chapters so that some guidance for further reading is provided. This is particularly necessary in view of the rather elementary character of the book.

ANCEL KEYS

Fundamental Principles of Bacteriology—By *A. J. Salle, B.S., M.S., Ph.D.* (2nd ed.). New York: McGraw-Hill, 1943. 643 pp. Price, \$4.00.

The second edition of this successful textbook is greatly improved by the removal of class laboratory directions to a separate volume. It still contains a considerable amount of advanced chemistry which is emphasized to an even greater extent than in the previous edition. There is some tendency to criticise this trend in textbooks on bacteriology but the present reviewer is definitely in agreement with the author that "no student can intelligently understand or pursue research in bacteriology without first having had a sound knowledge of at least inorganic and organic chemistry."

In the present edition there are 27 chapters, including good discussions of the Bacteriology of Food, Soil, Milk,

Water, etc. There is new material on the electron microscope, bacterial nutrition, enzymes, respiration, etc. Gramicidin and actinomycin are discussed but there is no mention of penicillin. Specific infections, as in the previous edition, are covered in a single chapter along with viruses and rickettsiae. However, discussion of fundamental topics like technic, disinfectants, sterilization, fermentation and putrefaction, growth phases, effects of environment, etc., are complete and specific.

The book is well written and edited and unusually fully illustrated. Bibliographies accompanying each chapter bring the literature generally to within a year or so of the date of publication. A well made index completes the volume. MARTIN FROBISHER, JR.

What the Public Knows about Health—By *Mayhew Derryberry, Arthur Weissman and George Caswell*. Published by the American Museum of Health, December, 1942. 144 pp.

This bulletin constitutes a report of investigations which were carried on at the New York and San Francisco Fairs to determine the extent of the health knowledge of the general public. Since information regarding the type of health knowledge which the public possesses is basic to all programs in health education, this report is directed particularly to those persons working in the field of health education. However, the excellent analysis of results will prove useful to many other workers.

The study was carried on at the New York Fair from April 30, 1939, to October 31, 1939, and in order to increase the number of persons tested and

also to widen the geographic distribution of those tested, the study was extended to include visitors to the Golden Gates Exposition in 1940. In this report are included a description of the physical set-up of the two testing centers and clearly stated information regarding the composition of the test questions and the administration of the tests. The analysis of the findings is well worth reading. In addition to presenting interesting and scientifically reliable facts, this report includes charts and tables which are most helpful to the reader.

The authors state that this report is the "first comprehensive study of what the man on the street knows about health," and their bulletin presents data obtained as a result of testing about 100,000 visitors to the Fairs. These visitors were each given one of the seven different question sheets as they presented themselves at the quiz booth. The tests varied from day to day, the same set of questions being used for all visitors on any one day. As each visitor finished his question sheet, it was automatically scored in a scoring machine which retained the test paper. The visitor was then either given a set of answers or these were mailed to him. Questions were asked on the topics of cancer, communicable disease, nutrition, general health information, superstitions and misconceptions, anatomy and physiology, maternal and child health, venereal disease, and tuberculosis.

What the Public Knows about Health appears in mimeographed form, in an Accobind Folder. This report of fundamental research has a place in every health education library.

BERYL J. ROBERTS

BOOKS RECEIVED

- THE EXAMINATIONS OF WATERS AND WATER SUPPLIES. By Ernest Victor Suckling. 5th ed. Philadelphia: Blakiston, 1943. 849 pp. Price, \$12.00.
- VITAMINS AND HORMONES. Vol. I. Edited by Robert S. Harris and Kenneth V. Thimann. New York: Academic Press, 1943. 452 pp. Price, \$6.50.
- REHABILITATION OF THE WAR INJURED. A Symposium. Edited by William Brown Doherty and Dagobert D. Runes. New York: Philosophical Library, 1943. 684 pp. Price, \$10.00.
- ANNUAL REVIEW OF PHYSIOLOGY. Vol. V. 1943. Editor, James Murray Luck. Stanford University: American Physiological Society & Annual Reviews, 1943. 613 pp. Price, \$5.00.
- GENERAL BACTERIOLOGY. By D. B. Swingle. New York: Van Nostrand, 1943. 313 pp. Price, \$3.00.
- THE PROBLEMS OF LASTING PEACE. By Herbert Hoover and Hugh Gibson. Garden City: Doubleday, Doran, 1942. 295 pp. Price, \$2.00.
- HOUSING YEARBOOK, 1943. Hugh R. Pomeroy and Edmond H. Hoben, Editors. Chicago: National Association of Housing Officials, 1943. 159 pp. Price, \$3.00.
- ORAL TESTS IN PUBLIC PERSONNEL SELECTION. Chicago: Civil Service Assembly of the United States and Canada, 1943. 174 pp.
- MEMOIR OF WALTER REED. The Yellow Fever Episode. By Albert E. Truby. New York: Hoeber, 1943. 239 pp. Price, \$3.50.
- SHIPBOARD MEDICAL PRACTICE. A Handbook of Ship Sanitation and Emergency Medical Aid at Sea. By W. L. Wheeler. New York: Cornell Maritime Press, 1943. 106 pp. Price, \$1.00.
- WHAT TO DO TILL THE DOCTOR COMES. By Donald B. Armstrong. New York: Simon & Schuster, 1943. 354 pp. Price, \$1.00.
- ATLAS OF HUMAN ANATOMY. By Franz Frohse, Max Brodel and Leon Schlossberg. New Ed. New York: Barnes & Noble, 1942. 86 pp. Price, \$2.25.
- THE WAR ON CANCER. By Edward Podolsky. New York: Reinhold, 1943. 179 pp. Price, \$1.75.
- MANAGING YOUR MIND. You Can Change Human Nature. By S. H. Kraines and E. S. Thetford. New York: Macmillan, 1943. 374 pp. Price, \$2.75.
- AIR-BORNE INFECTION. By Dwight O'Hara. New York: Commonwealth, 1943. 114 pp. Price, \$1.50.
- PUBLIC HEALTH NURSING IN OBSTETRICS. Part IV. Mothers' and Fathers' Classes. New York: Maternity Center, 1943. 108 pp. Price, \$1.00.
- THE ARMY MEDICAL BULLETIN NUMBER 67. May, 1943, Special Issue. The Prevention and Control of Venereal Diseases in the Army of the United States of America. By Colonel Joseph F. Siler. Office of The Surgeon General, U. S. Army, Washington, D. C.
- YOU, YOUR CHILDREN AND WAR. By Dorothy W. Baruch. New York: Appleton-Century, 1942. 234 pp. Price, \$2.00.
- CHILDREN HAVE THEIR REASONS. By Ruth Wendell Washburn. New York: Appleton-Century, 1942. 257 pp. Price, \$2.00.
- AS THE CHILD GROWS. By Helen Brenton Pryor. New York: Silver Burdett, 1943. 400 pp. Price, \$3.00.
- HEALTH AND PHYSICAL FITNESS. By I. H. Goldberger and Grace T. Hallock. New York, Ginn, 1943. 596 pp. Price, \$1.92.
- RHEUMATIC FEVER IN CHILDREN. ITS RECOGNITION AND MANAGEMENT. New York: Metropolitan Life Ins. Co., 1943. 29 pp.
- HANDBOOK OF INFORMATION ON RED CROSS HOME NURSING AND A TEACHING GUIDE OF INSTRUCTORS OF RED CROSS HOME NURSING. The American National Red Cross, Washington, D. C.
- SOCIAL HYGIENE NURSING TECHNIQUES. By Nadine B. Geitz. New York: American Social Hygiene Association, 1943. 77 pp. Price, \$2.25.
- VENEREAL DISEASE CLINICS, 1943 revision of Supplement No. 4 to Venereal Disease Information. U. S. Public Health Service, Division of Venereal Diseases, Washington.
- HEALTH PROBLEMS IN NEGRO COLLEGES. Proceedings of the First and Second Annual Meetings of the National Student Health Association. New York: National Tuberculosis Association, 1943.
- THE KITCHEN IN WAR PRODUCTION. By Helen Hill. New York: Public Affairs Committee, 1943. Price, \$1.00.

EXHIBITS—HOW TO PLAN AND MAKE THEM.

By Bruno Gebhard, H. E. Kleinschmidt, Marion McKinney, Evelyn Engel and Beatrice Tolleris. New York: National Publicity Council, 1943. 30 pp. Price, \$.60.

FREEDOM FROM WANT: A WORLD GOAL. By Elizabeth E. Hoyt. New York: Public Affairs Committee, 1943. Price, \$.10.

CAREERS IN PUBLIC HEALTH. By Adrian G. Gould. Chicago: Science Research Associates, 1943. Price, \$.60.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Good News—No evidence has yet been uncovered indicating that the increased employment, the harder work, the longer hours, the crowded boom towns have adversely affected the downward trend of the tuberculosis death rate. In the reported sample, every month since Pearl Harbor has registered a lower rate. It is, however, too early for one to become complacent and to neglect any single tuberculosis preventive measure.

ANON. War Time Trends in Tuberculosis. Stat. Bull. (Met. Life Ins. Co.). 24, 5:1 (May), 1943.

Seems Like a Good Idea!—As fluorine in drinking water appears to affect dental caries, this thesis proposes that 1.0 p.p.m. of fluorine be added—as it could easily be—to some municipal water supply for which a competent control area could be selected.

AST, D. B. The Caries-Fluorine Hypothesis and a Suggested Study To Test Its Application. Pub. Health Rep. 58, 23:857 (June 4), 1943.

For Mental Comfort, General Efficiency and Safety—Even though you haven't the remotest connection with industrial hygiene, you can't help but be interested in this sprightly discussion of the use of color in work places. Here is a sample: "So Mary and John meet at noon in the peach cafeteria. And that evening they meet again, one from a rose locker room, the other from a blue, to walk down an ivory hued stairway."

BIRREN, F. Color Technique in Industry. Sight-Saving Rev. 13, 1:3 (May), 1943.

And We Salute You, Sir!—You will surely not want to miss this graceful and informal word of parting from one who remembers the giants of the olden days. Not many there are of us who knew Koch and Loeffler and Klebs and Gaertner and Biggs, and every word dropped by those who did should be gathered up by all.

BOLDUAN, C. F. Some Reminiscences and a Valedictory. Quart. Bull. (City of N. Y. Dept. of Health). 11, 2:23 (May), 1943.

When Women Work for War Wages—Industrial absentee rates have risen from a normal 3 per cent to an all-time high of 8 to 10 per cent. Newly added women workers seem to be chiefly responsible for the larger part of this increase. Youth is another factor. There is a whole six-course dinner for thought in this brief discussion.

DANIELS, L. R. Medical Aspects of Absenteeism. New Eng. J. Med. 228, 24:773 (June 17), 1943.

Mental Comfort for Next Winter's Shivers—Colder homes in the winter of 1942-1943 probably were responsible for only very small increases in respiratory diseases, and in the opinion of some sanitarians more good than harm resulted from fuel oil limitation.

DEAN, J. Fuel Rationing and Public Health. J.A.M.A. 122, 8:511 (June 19), 1943.

Not Blindness But Idleness, the Burden—It will do no harm to any of us to keep intelligently open minds upon questions of the care of the blind even though we don't make a living in this field of public service, so you are hereby cordially invited to taste this discussion of the rehabilitation of the war blinded.

FARRELL, G. For Those in Darkness. Survey Midmonthly. 79, 6:167 (June), 1943.

How Much Do Nurses Cost?—How much will a generalized public health nursing service cost a health department? You may want to know in order to make a budget, or to compare yours with others' experience, or to make changes. You'll find useful figures in this committee report.

GAVERNS, H. Public Health Nursing Costs in a Health Department. Pub. Health Nurs. 35, 6:299 (June), 1943.

Food-borne Infections—Disconcerting evidence of the chances we take whenever we eat runs through this excellent review of recent studies of amebiasis, trichinosis, typhoid fever, etc., etc. Useful source material for your files.

GETTING, V. A. Epidemiologic Aspects of Food-borne Disease. New Eng. J. Med. 228, 23:754 (June 10), 1943.

More Potent Typhoid Vaccine—A purified antigenic material obtained from an *Eberthella typhosa* culture and administered in 1 mg. dosage produced mouse-protective antibodies in greater amounts than 2.4 ml. of standard vaccines, and with less local and constitutional reactions.

MORGAN, H. R., et al. Immunizing Potency in Man of a Purified Antigenic Material Isolated from *Eberthella Typhosa*. J. Immunol. 46, 5:301 (May), 1943.

Day Nursery Meals—Many health officials, who are concerned with the care of children of war-working mothers,

will be helped by this discussion of mass feeding of toddlers.

PELLER, L. E. Eating in Groups in War Time. Ment. Hyg. 27, 2:188 (Apr.), 1940.

Encephalitis Prophylaxis—Should a severe epidemic of the St. Louis or Japanese Type B encephalitis occur it may prove worth while to use a non-infective vaccine, which has shown its protective value in volunteers.

SABIN, A. B., et al. The St. Louis and Japanese B Types of Epidemic Encephalitis. J.A.M.A. 122, 8:477 (June 19), 1943.

And What Are You Doing about This Nutrition Business?—Two sentences from this challenging paper ought to be sufficiently provocative to send you to the issue of the "Reports" in which it is published. There are two other good papers on the same topic which you will not want to miss. Here are the sentences? "It has already taken too long for public health officials to recognize that malnutrition is a problem in preventive medicine." and "We have, to some extent, in this country every dietary deficiency disease known to man."

SEBRELL, W. H., and WILKINS, W. The Rôle of the Health Department in the National Nutrition Program. Pub. Health Rep. 58, 21:803 (May 21), 1943.

Rats!—Community sprees of rat-catching with attending publicity hullabaloo are futile health gestures. Rodent control in cities is an essential public health measure of an entirely different complexion. How it may be accomplished effectively is outlined in an important paper—considering the fact that sylvatic plague may spread some day to our rat-infested industrial cities which are already enjoying an increasing typhus incidence.

SHERRARD, G. C. A Plan for Rodent Control in Cities. Pub. Health Rep. 58, 22, 825 (May 28), 1943.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND
SEVENTY-SECOND ANNUAL BUSINESS MEETING
AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

Headquarters: Hotel Pennsylvania

*PRELIMINARY PROGRAM will be published in
the September Journal*

LOCAL COMMITTEE APPOINTED

The Local Committee on Arrangements for the Wartime Conference and the 72nd Annual Business Meeting is as follows:

Chairman: Ernest L. Stebbins, M.D.
Honorary Chairman: The Honorable Fiorello
H. LaGuardia
Co-Chairman: Edward S. Godfrey, Jr., M.D.
Secretary: Leona Baumgartner, M.D.
Treasurer: Matthew Byrne

Subcommittee Chairmen
Finance: Frank Kiernan
Meeting Rooms: John Oberwager, M.D.
Publicity: Frank A. Calderone, M.D.
Radio: Iago Galdston, M.D.
Reception: John L. Rice, M.D.

NOMINATIONS FOR THE THE GOVERNING COUNCIL

In accordance with the By-Laws of the Association, the Nominating Committee for Governing Council members, consisting of one Fellow from each Section, reports the following nominations for the Governing Council. The By-Laws provide that "upon the petition of twenty-five Fellows, the Nominating Committee shall add the name of any Fellow to this list, provided such petition is received fifteen days before the Annual Meeting." The Chairman of the Committee is Friend Lee Mickle, Sc.D., Director of Laboratories, State Department of Health, Hartford, Conn.

The other members are: Gordon M. Fair, Engineering Section; Wilton L. Halverson, M.D., Health Officers Section; Albert C. Hunter, Ph.D., Food and Nutrition Section; Robert A. Kehoe, M.D., Industrial Hygiene Section; Hugo Muench, M.D., Vital Statistics Section; Sophie C. Nelson, R.N., Public Health Nursing Section; Alton S. Pope, M.D., Epidemiology Section; William D. Stovall, M.D., Laboratory Section; Clair E. Turner, Dr.P.H., Public Health Education Section; Estella F. Warner, M.D., Maternal and Child Health Section. (The representatives

from the new School Health Section will be elected at the forthcoming Annual Business Meeting.)

There are thirty elective councilors on the Governing Council, of whom ten are elected each year. The ten Fellows receiving the highest number of votes on a written ballot cast by the Fellows present and voting at the Annual Meeting in New York City will be elected for the three year term 1943-1946.

George Baehr, M.D.
Office of Civilian Defense
Washington, D. C.

M. E. Barnes, M.D.
State University of Iowa
Iowa City, Ia.

W. W. Bauer, M.D.
American Medical Association
Chicago, Ill.

Selwyn D. Collins, Ph.D.
U. S. Public Health Service
Washington, D. C.

Edwin L. Crosby, M.D.
Johns Hopkins Hospital
Baltimore, Md.

George B. Darling, Dr.P.H.
W. K. Kellogg Foundation
Battle Creek, Mich.

Paul A. Davis, M.D. ,
Goodyear Tire and Rubber Company
Akron, Ohio

R. E. Dyer, M.D.
National Institute of Health
Bethesda, Md.

R. F. Feemster, M.D.
State Department of Health
Jamaica Plain, Mass.

Leroy U. Gardner, M.D.
Director, Trudeau Foundation
Saranac Lake, New York

Edward S. Godfrey, Jr., M.D.
State Commissioner of Health
Albany, N. Y.

Arthur H. Graham, M.D.
East Alabama Health District
Opelika, Ala.

Albert S. Gray, M.D.
State Department of Health
Hartford, Conn.

Jean Gregoire, M.D.
Ministry of Health
Quebec, Que.

Lucy Heathman, M.D.
State Department of Health
Minneapolis, Minn.

Herman E. Hilleboe, M.D.
U. S. Public Health Service
Chevy Chase, Md.

Prof. Charles G. Hyde
University of California
Berkeley, Calif.

Sally Lucas Jean
Pemaquid Point, Me.

W. S. Leathers, M.D.
Vanderbilt University
Nashville, Tenn.

Hugh R. Leavell, M.D.
Director of Health
Louisville, Ky.

Helen S. Mitchell, Ph.D.
Office of Community War Services
Washington, D. C.

Joseph W. Mountin, M.D.
U. S. Public Health Service
Washington, D. C.

George St. J. Perrott
U. S. Public Health Service
Washington, D. C.

W. S. Rankin, M.D.
Duke Foundation
Charlotte, N. C.

Emilie G. Sargent, R.N.
Visiting Nurse Association
Detroit, Mich.

T. F. Sellers, M.D.
State Board of Health
Atlanta, Ga.

John J. Sippy, M.D.
San Joaquin County Health District
Stockton, Calif.

Walter D. Tiedeman, M.C.E.
State Department of Health
Albany, N. Y.

Arthur D. Weston
State Department of Health
Newton, Mass.

Robert E. Wodehouse, M.D.
Department of Pensions and National Health
Ottawa, Ont.

RATES QUOTED BY NEW YORK HOTELS

War-time Public Health Conference and Seventy-second Annual
Business Meeting—October 12-14, 1943

| | Rooms With Bath | |
|---|-----------------|--------------|
| | Single | Double |
| <i>Headquarters:</i> | | |
| Hotel Pennsylvania, 7th Avenue and 33rd Street | \$3.85- 8.80 | \$5.50- 9.90 |
| <i>Hotels near Hotel Pennsylvania:</i> | | |
| Governor Clinton, 31st Street and 7th Avenue | 3.30- 5.50 | 4.40- 7.70 |
| McAlpin, Broadway and 34th Street | 3.30- 6.60 | 4.95- 8.80 |
| New Yorker, 34th Street and 8th Avenue | 3.85- 8.80 | 5.50-11.00 |
| <i>Selected Hotels Outside Pennsylvania Zone:</i> | | |
| Ambassador, Park Avenue and 51st Street | 5.00- 8.00 | 7.00-10.00 |
| Astor, Broadway and 44th Street | 3.00- 5.00 | 5.00- 8.00 |
| Barbizon (Women), Lexington Avenue and 63rd Street | 3.00- 3.50 | 4.50- 5.50 |
| Biltmore, Madison Avenue and 43rd Street | 5.50-12.00 | 7.50-14.00 |
| Bristol, 129 West 48th Street | 2.50- 4.00 | 3.50- 6.00 |
| Commodore, Lexington Avenue and 42nd Street | 3.50- 5.50 | 5.50- 8.80 |
| Cornish Arms, 311 West 23rd Street | 2.25- 2.50 | 3.50- 4.00 |
| Fifth Avenue Hotel, 24 Fifth Avenue (9th Street) | 3.75- 5.00 | 5.00- 7.00 |
| George Washington, 23rd Street and Lexington Avenue | 2.00- 4.00 | 3.50- 6.00 |
| Lexington, 48th Street and Lexington Avenue | 4.00- 6.00 | 5.50- 8.00 |
| Lincoln, 8th Avenue and 44th Street | 3.00- 5.00 | 4.00- 8.00 |
| Midston House, 22 East 38th Street | 3.00- 3.25 | 4.00- 4.50 |
| New Weston, Madison Avenue and 50th Street | 4.00- 6.00 | 6.00- 9.00 |
| Paramount, 46th Street, West of Broadway | 2.50- 4.50 | 4.00- 8.00 |
| Park Central, 7th Avenue and 55th Street | 4.00- 5.00 | 6.00- 7.00 |
| Parkside, 18 Gramercy Park South | 2.50- 3.00 | 5.00 |
| Piccadilly, 227 West 45th Street | 2.50- 4.00 | 3.50- 6.00 |
| Prince George, 14 East 28th Street | 2.50- 4.00 | 3.50- 7.00 |
| Roosevelt, Madison Avenue and 45th Street | 4.50- 8.00 | 6.50-12.00 |
| St. Regis, Fifth Avenue and 55th Street | 6.00- 7.00 | 7.00-11.00 |
| Seymour, 50 West 45th Street | 4.00- 5.00 | 5.50- 6.00 |
| Shelton, 49th Street and Lexington Avenue | 3.50- 5.00 | 5.00- 7.00 |
| Waldorf-Astoria, 50th Street and Park Avenue | 7.00-10.00 | 10.00-15.00 |
| Wellington, 7th Avenue and 55th Street | 2.50- 4.00 | 3.50- 6.00 |

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

- Jesse B. Aronson, M.D., Bannock County Health Unit, Pocatello, Ida., P.A. Surgeon (R), U. S. Public Health Service; Acting Director
- P. Richard Auriemma, M.D., 5716 Bay Shore Walk, Long Beach, Calif., Senior Physician, Los Angeles County Health Dept.
- Charles M. Covington, M.D., Box 270, Belton, Tex., Director, Central Texan Health Dept.
- Stephens L. Harp, M.D., Greenville, Ga., Commissioner of Health, Meriwether County Health Dept.
- Robert E. Karrer, M.D., 535 Finch Bldg., Aberdeen, Wash., Asst. Surgeon (R), U. S. Public Health Service
- Angelo M. Perri, M.D., 814 Federal St., Philadelphia, Pa., Senior Medical Officer, Dept. of Health
- Wieland W. Rogers, M.D., 962nd Main St., Jacksonville, Fla., City Health Officer
- Harold H. Rutledge, M.D., Hernande, Miss., Director, Tate County Health Dept.

- Edward S. Schulze, M.D., 72 3rd Ave., San Mateo, Calif., Physician in charge, Communicable Disease Section, San Mateo County Dept. of Public Health and Welfare
- Leonard O. Schwartz, M.D., Box 310, Weirton, W. Va., Health Director, Hancock County Health Dept.
- Charlotte Singer-Brooks, M.D., M.S.P.H., 2504 H St., Sacramento, Calif., Medical Officer, State Dept. of Public Health
- Robert G. Wetterstroem, M.D., P. O. Box 47, Olathe, Kans., Director, Johnson County Health Dept.
- Royal W. Williams, M.D., 103 Main St., Yazoo, Miss., P.A. Surgeon, U. S. Public Health Service; Acting Health Officer

Laboratory Section

- Robert W. Ambrose, Lederle Laboratories, Inc., Pearl River, N. Y., Research Chemist
- Harlan D. Anderson, Ph.D., State Dept. of Health Laboratories, Lansing, Mich., Biochemist

Herbert C. Batson, Ph.D., 125 W. Kilborn St., Lansing, 6, Mich., Acting Assoc. Director, State Dept. of Health Bureau of Laboratories

George W. Chu, D.Sc., Bureau of Sanitation, Board of Health Bldg., Honolulu, T. H., Asst. Bacteriologist, Territorial Board of Health

Marion Cody, M.S., 224 Crescent Ave., Peoria, Ill., Bacteriologist, Peoria Health Dept.

Virginia M. Eve, Lederle Laboratories, Inc., Pearl River, N. Y., Supervisor of Blood Plasma

Lieut. Robert M. Johnston, Sn.C., 504 North Second St., Harrisburg, Pa., Laboratory Officer, A. U. S., Camp Butner, N. C.

Lucile M. Portwood, M.S., P. O. Box 76, Okemos, Mich., Bacteriologist, Michigan Dept. of Health

Elizabeth D. Tintle, Lederle Laboratories, Inc., Pearl River, N. Y., Supervisor

Engineering Section

Julio G. Calderin, 73 Georgetti St., Rio Piedras, Puerto Rico, Sanitarian, Insular Health Dept.

William C. Chaplin, 1520 Court St., Alameda, Calif., Student, State College of Washington

Ernest E. Frisby, 1012 Kilson Drive, Santa Ana, Calif., Chief, Division of Sanitation, Orange County Health Dept.

Stanley H. Gates, 950 Dollison Ave., Springfield, Mo., City Sanitary Inspector

Frank S. Hemmings, Jr., 701-3 Persons Bldg., Macon, Ga., Engineering Aide, State Dept. of Health

Jenaro Maldonado-Capriles, Luno 50, San Juan, Puerto Rico, Entomologist, Bureau of Malaria Control, Puerto Rican Dept. of Health

Fausto Mariota-Trias, Box 543, Rio Piedras, Puerto Rico, Senior Sanitarian, Insular Health Dept.

Thomas M. Sperbeck, 309-C St., Marysville, Calif., Sanitarian, Sutter-Yuba Bi-County Health Unit

Earle W. Tibbetts, 110 Main St., Farmington, Me., District Sanitary Engineer, State Bureau of Health

Ben F. Williams, 1628 Palma Plaza, Austin, Tex., Engineer, State Dept. of Health

Joseph B. Winston, 1650 Bonnie Brae, Houston, Tex., Sanitary Engineer, Harris County Health Unit

Industrial Hygiene Section

Henry N. Doyle, 1911 4th Ave., W., Birmingham 3, Ala., Asst. Public Health Engineer, U. S. Public Health Service

Crit Pharris, M.D., 27 Bretton Rd., West

Hartford, Conn., Industrial Hygiene Physician, United Aircraft Corp.

Angel Reaud, M.D., Calle J 556, Vedado, Habana, Cuba, Professor of Industrial and Social Hygiene, Escuela Tecnica General Aleman

Food and Nutrition Section

Eleanor M. Bigelow, M.S., 1340 Lombard St., Philadelphia 47, Pa., Nutrition Consultant, Visiting Nurse Society of Phila.

Mary B. Horton, 524 West 57th St., New York, N. Y., Educational Director, Sheffield Farms Co., Inc.

M. Helen McLachlan, M.A., 1325 S. Grand, St. Louis, Mo., Instructor in Dietetics, School of Nursing, St. Louis Univ.

Irene K. Renz, 1701 Grove Ave., Richmond 20, Va., Nutritionist, State Dept. of Health

Maternal and Child Health Section

Frances E. Brennecke, M.D., 721 N. State St., Jackson 6, Miss., Director, Maternal and Child Health, State Board of Health

Paul Claveau, M.D., D.P.H., Health Unit, Chicoutimi, Quebec, Canada, Medical Officer, Ministry of Health

Alpheus J. Cross, D.D.S., P. O. Box 101, Freedom, Pa., District Dental Officer, Western Pa. Dental Div., State Dept. of Health

Eli H. Keshishian, Ph.G., 830 Moody, Waltham, Mass., Student, Middlesex Univ.

Olimpia T. Zeno, P. O. Box 1466, San Juan, Puerto Rico, Supervisor, Medical Social Work, Public Health Unit

Public Health Education Section

Boyce N. Campbell, 1015 West "B" St., Russellville, Ark., Public Health Sanitarian, State Board of Health

William M. Flaherty, Box 518, Santa Rosa, Calif., Exec. Sec., Sonoma County Tuberculosis Assn.

Florence B. Hopkins, M.D., D.M.D., Room 319, 73 Tremont St., Boston, Mass., Dental Consultant, State Dept. of Public Health

Edith Kostol, Room 112, Court House, Bend, Ore., Secty., Deschutes County Health Assn.

Dr. Jose R. Martinez, Calle de Concepcion 62, San Salvador, El Salvador, C. A., Trainee, Heiman Kiefer Hospital, Detroit, Mich.

Hellen R. Perrin, 836 E. 17th Ave., Denver, Colo., Interested citizen (served as City Commander of Cancer Control Campaign)

Evelyn A. Potter, 20 Central St., Topsfield, Mass., Public Health Education Worker, Div. of Adult Hygiene, State Dept. of Public Health

Beryl J. Roberts, M.Ed., 73 High St.,
Charlestown, Mass., Health Educator,
Boston Health Dept.
Robert C. Tyson, Box 215, St. Maries, Ida.,
Sanitarian, State Dept. of Public Health

Public Health Nursing Section

Bess Alverson, Public Health Dept., Moscow,
Ida., Staff Nurse, Latah County Health
Unit
Virginia Cartagena, Box 284, Utuado, Puerto
Rico, Supervisor of Public Health Nurses,
Dept. of Health
Mildred S. Chambers, 3446 Connecticut Ave.,
Washington 8, D. C., Asst. to Director of
Home Nursing, American Red Cross
Winnie L. Doyle, M.A., Health Dept., Man-
chester, Tenn., Consultant Nurse, State
Dept. of Public Health
Edythe M. Frethy, 105 Ellison Ave., Beckley,
W. Va., Supervising Nurse, Koppers Coal
Division
Louise Guidry, M.A., 204 Roselawn, Monroe,
La., Regional Advisory Nurse, State Dept.
of Health
Harriet M. Holley, R.N., Board of Education,
St. Joseph, Mo., Supervisor of School
Nurses
Anna C. Myers, 802-5th Ave. Bldg., Moline,
Ill., Public Health Nurse, State Dept. of
Public Health
Ann A. Pador-Razim, 3645 Clinton Ave.,
Berwyn, Ill., Public Health Nurse, Berwyn
Health Dept.
Loretta T. Schuler, R.N., Kendrick, Ida.,
Senior Public Health Staff Nurse, North
Central District Health Unit
Bess W. Storey, 4606 Windom Place, N.W.,
Washington 16, D. C., Staff Nurse, District
of Columbia Health Dept.
Ethel Turner, R.N., Manhattan Beach,
Severna Park, Anne Arundel County, Md.,
Supt., Instructive Visiting Nurse Assn. of
Baltimore City

Epidemiology Section

Lieut. Hyman E. Bass, M.C., Bruns General
Hospital, Santa Fe, N. M.
John C. Connor, 4415 Voltaire St., San Diego,
Calif., Qualified Asst. in Epidemiology,
U. S. Navy
Capt. Owen S. Ogden, M.C., Station Hospital,
Ft. F. E. Warren, Wyo., Epidemiologist,
U. S. Army
Henrietta R. C. Paine, M.P.H., 543 Leonard
Rd., Oakdale Farms, Norfolk 5, Va., Stu-
dent, Yale Univ., Dept. of Public Health
Leon S. Saler, M.D., M.P.H., 805 Bauer Ave.,
Charleston, W. Va., Act. Director, Bureau
of Venereal Diseases, State Health Dept.

School Health Section

Werner H. Bloch, M.D., 206 Grove St.,
Elmira, N. Y., Chief Medical Supervisor,
Board of Education
Carmelite Janvier, M.A., 703 Carondelet St.,
New Orleans, La., Director of Special Ser-
vices, New Orleans Public Schools
Paul G. Lacroix, M.D., 500 Medical Arts
Bldg., New Orleans, La., Asst. Medical
Director, Orleans School Board
Mary B. H. Michal, M.D., Health Dept.,
Waynesville, N. C., Asst. District Health
Officer, Dist. Health Dept.

Unaffiliated

Francisca Bou, Bou, Corozal, Puerto Rico,
Supervisor of Medical Social Work, Dept.
of Health
Roy H. Bridger, D.D.S., 8714 Cameron, Silver
Spring, Md., Dental Clinician, Montgomery
County Health Dept.
Thos. H. Charrey, M.S., 410 Bannock, P. O.
Box 2145, Boise, Ida., Merit System Super-
visor, State Dept. of Public Health
Dolores G. de La Caro, Arzuaga 1, Rio
Piedras, Puerto Rico, Chief, Bureau of
Medical Social Services, Div. of Public
Health, Dept. of Health
Sidney B. Finn, D.M.D., New York State
Dept. of Health, Albany, N. Y., Senior
Dentist
Emelie Levin, M.S.S., 1000 Admiral Blvd.,
Kansas City 6, Mo., Exec. Director, Alfred
Benjamin Dispensary
Monseratte G. Olmo, Box 167, Lares, Puerto
Rico, Medical Social Work Supervisor,
Dept. of Health
William Atmar Smith, M.D., 72 Society St.,
Charleston, S. C., Practising Physician

DECEASED MEMBERS

Theodore V. Bauer, M.D., Buffalo, N. Y.,
Elected Member 1924, Industrial Hygiene
Section
D. N. Cone, M.D., Jasper, Fla., Elected Mem-
ber 1937, Epidemiology Section
Warren F. Draper, Jr., M.D., Parris, Tex.,
Elected Member 1942, Health Officers
Section
Hubert Flurry, M.D., Booneville, Miss.,
Elected Member 1942, Health Officers Sec-
tion
Sir Arthur Newsholme, Worthing, Sussex,
England, Honorary Fellow 1931
Dr. Mosby G. Perrow, Lynchburg, Va.,
Elected Member 1908, Elected Fellow 1922,
Health Officers Section
Fred C. Spalding, Valley City, N. D., Elected
Member 1939, Public Health Education
Section

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.

POSITIONS AVAILABLE

MEDICAL OFFICERS NEEDED—TENNESSEE VALLEY AUTHORITY

The Tennessee Valley Authority is in urgent need of medical officers who are not eligible for military service and who are willing to accept assignments to war industrial activities (construction, manufacture of war chemicals and manufacture of hydroelectric power) as their participation in the all out war effort. Responsibilities include physical examinations, industrial hygiene, care of injuries, medical care to families in remote construction areas and general public health responsibilities in construction camps and villages.

Salary ranges from \$3,200 to \$4,200 per annum with opportunity for promotion.

For further information write to Dr. E. L. Bishop, Director of Health, Tennessee Valley Authority, Chattanooga, Tenn., or to the Personnel Department, Tennessee Valley Authority, Knoxville, Tenn.

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

Merit System for Personnel Administration, Delaware, is accepting applications for position of Deputy State Health Officer in Delaware State Board of Health. Salary range \$3,600 to \$4,200. Applica-

tions accepted until further notice. Those interested should communicate with Merit System Supervisor, P. O. Box 1911, Wilmington, Del., or State Board of Health, Dover, Dela.

Notice of an expected vacancy for an Industrial Hygiene Engineer in the Los Angeles County Health Department has been received. Those interested should communicate with Dr. H. O. Swartout, Acting County Health Officer, Los Angeles, Calif.

Tuberculosis Association in large eastern city is accepting applications for position on staff as health education secretary. Requirements: basic training in health education. Experience desirable. Should have ability in public speaking, radio, newspaper and visual education including sound motion pictures and exhibits. One month's vacation. Five day week with occasional work on Saturdays. Young man exempt from military service. Address Box K, Employment Service, A.P.H.A.

Announcement is made of the following examinations to be held by the State Personnel Board, Seattle, Wash., for positions in the State Department of Health and County Health Departments:

| Position | Salary Range | |
|---|--------------|---------|
| | Entrance | Maximum |
| Bacteriologist B..... | \$160 | \$190 |
| Laboratory Helper D... | 120 | 140 |
| Laboratory Assistant C | 140 | 160 |
| Laboratory Technician | 140 | 170 |
| District Public Health Officer V | 380 | 440 |
| Public Health Nurse B | 160 | 190 |
| Asst. Venereal Disease Investigator B | 160 | 190 |
| General Sanitarian A... | 190 | 220 |
| Milk Sanitarian A..... | 190 | 220 |
| Chief of Public Health Education | 280 | 320 |
| Senior Milk Sanitarian.. | 220 | 250 |
| Obstetric Consultant VI | 440 | 500 |
| Pediatric Consultant VI | 440 | 500 |
| Senior Bacteriologist A | 190 | 220 |

THE MERIT SYSTEM COUNCIL OF WEST VIRGINIA
ANNOUNCES UNASSEMBLED EXAMINATIONS
FOR THE FOLLOWING POSITIONS IN THE WEST
VIRGINIA STATE HEALTH DEPARTMENT

| Position | Salary |
|--|-----------------|
| Director of Maternal and Child Hygiene | \$4,200-\$4,800 |
| Assistant Director, Maternal and Child Hygiene.. | 3,840- 4,500 |
| Director, Industrial Hygiene | 4,200- 4,800 |
| Director, Vital Statistics... | 4,200- 4,800 |
| Director, Communicable Diseases | 4,200- 4,800 |
| Assistant Director of Communicable Diseases (Tuberculosis) | 3,840- 4,500 |
| Assistant Director of Communicable Diseases (Venereal Disease) | 3,840- 4,500 |
| Venereal Disease Consultant | 3,840- 4,500 |
| Director, Bureau of Dental Hygiene | 3,840- 4,500 |
| Director of County Health Work | 4,200- 4,800 |
| Senior Health Officer..... | 3,840- 4,500 |
| Junior Health Officer..... | 3,360- 3,840 |
| Health Officer Trainee.... | 2,400 |
| Assistant Director, Hygienic Laboratory | 2,640- 3,240 |
| Senior Bacteriologist | 1,800- 2,400 |
| Senior Serologist | 1,800- 2,400 |
| Consultant Nurse in Special Fields | 2,400- 3,000 |
| Public Health Nursing Supervisor (State level)... | 1,920- 2,400 |
| Public Health Nursing Supervisor (Local level).. | 1,800- 2,040 |
| Chief of Medical Services.. | 4,800- 5,280 |

Persons interested should make application to the Merit System Council, 212 Atlas Building, Charleston, W. Va.

Residence in West Virginia has been waived. Applications will be accepted continuously.

Council of Social Agencies in large Midwestern city is seeking person to fill position of assistant secretary in its health division. Responsibilities include coördinating, planning, and promoting of adequate community health services. Involves working with medical and health agencies and organizations and with committees. Beginning salary \$3,000. Applications should indicate training and experience and references. Box R, Employment Service, A.P.H.A.

Sanitarian wanted: Starting salary \$1,800 per year with travel allowance of \$50 per month. Man must have own car. Bachelor's degree followed by at least

one year's course or its equivalent in subjects necessary for one entering the public health field, or an engineering degree plus one year's experience in sanitary or public health engineering required. A course in public health training may be considered as an equivalent for a part of the experience requirement. Apply Dist. Dept. of Health No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Wanted: Two physicians, immediate appointment, full-time venereal disease clinician, conduct several small clinics rotating schedule. Experience preferred. Salary \$3,600 plus actual expense not to exceed \$1,200. Write State Health Department, Santa Fe, New Mexico:

The Board of Health, Territory of Hawaii, announces applications will be received for positions as Medical Technician in their public health laboratories. The positions: Civil Service Classifications, SP-5, salary range \$154.17 to \$192.92 per month; SP-6, \$172.50 to \$217.50 per month, subject to retirement deductions under Hawaiian Civil Service System, plus graded bonus for the period of time such bonus remains in effect for Territorial Government employees.

Interested persons may make written application to Board of Health, Territory of Hawaii, P. O. Box 3378, Honolulu, T. H.

Wanted: Laboratory technician, tuberculosis hospital, 130-150 beds. Salary \$175 per month and full maintenance. Opportunity to do research. Nice surroundings, good living quarters. Write Dr. Paul D. Crimm, Boehne Hospital, Evansville, Ind.

Physician—public health pediatrics. To assist director of maternal and child health in large California County Health Department. Major duties, conducting of infant and preschool health conferences and school examinations. Beginning salary \$350 and travel allowance. California license required. Training and experience in pediatrics or public health or both. Immediately available. Address William C. Buss, M.D., Kern County Health Department, Bakersfield, Calif.

Wanted: A physician trained in tuberculosis to assume administrative control of the Bureau of Tuberculosis in an eastern city of 200,000 population. Salary \$3,900-\$4,500 plus cost of living adjustment. Address Box B, Employment Service, A.P.H.A.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK 19, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

Physician, age 36, M.D., Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. **A-476**

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. **A-505**

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and

bacteriologist and serologist in syphilis and enteric diseases. **L-465**

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as city or county health officer or director of a bureau. **A-506**

Woman physician, well prepared in pediatrics, M.S.P.H. DeLamar Institute, Columbia University, 1943, seeks employment in the field of maternal and child health, preferably administrative in pediatrics. Excellent references. **A-507**

NEWS FROM THE FIELD

HEALTH DEPARTMENT FUNCTIONS IN CIVILIAN PROTECTION

The Office of Civilian Defense has published an *Operations Letter No. 131* on the Health Department in Civilian Protection for distribution to state and local defense councils. At the request of George Baehr, M.D., Chief Medical Officer of the O.C.D., the letter is reprinted herewith.

Organization

Local—Regulations No. 3 of the Office of Civilian Defense provides that the Staff Unit of the U. S. Citizens Defense Corps "may include the Health Officer, who shall advise the Commander regarding emergency measures for disease prevention. He may be assisted by his deputies, division chiefs, and sanitary inspectors." (Section 16 (d) (11) of Office of Civilian Defense Regulations No. 3, amended to August 1942.)

Accordingly, it is recommended that each Commander of the U. S. Citizens Defense Corps, who has not already done so, appoint the local Health Officer as a member of his staff, in order that emergency health and sanitation activities may be properly coordinated with all protective services of the U. S. Citizens Defense Corps. A Health Officer serving as Chief of the Emergency Medical Service need not relinquish that position. He may assign deputies to act for and assist him in direction of the Emergency Medical Service or in supervision of emergency health and sanitation activities, or both.

State—The State Health Officer has important responsibilities defined by law. The State Defense Council should obtain his guidance and leadership in developing the civilian protection health and sanitation program throughout the State. In some States, agencies such as the departments of agriculture, labor, and welfare also may have legal responsibilities for certain matters affecting health. In these States it may be desirable to appoint a Health and Sanitation Committee, composed of representatives of all such agencies, to arrange, in accordance with existing State law, for the fullest utilization of personnel and facilities for the protection of health.

Duties

The Health Officer, as a member of the Staff of the Citizens Defense Corps, should develop plans for prompt and appropriate action during and after air raids or other disasters to assure:

1. Maintenance of safe water, food, and milk supplies.
2. Sanitary disposal of sewage and putrescible wastes.
3. Sanitation at mass feeding centers, rest centers, casualty stations, billets, and other temporary facilities for war emergencies.
4. Control of communicable disease.

Planning should include the mechanism for mobilizing essential personnel during and following an actual emergency, as well as arrangements for immediate instruction of the public in emergency sanitary measures in event of disaster. The Health Officer should review the plans and inspect the facilities of other services of the Citizens Defense Corps in order to eliminate potential health hazards.

Membership in the U. S. Citizens Defense Corps

The Health Officer, his deputies (including deputized volunteers), division chiefs, and sanitary inspectors are eligible for membership in the Staff Unit of the U. S. Citizens Defense Corps to facilitate performance of their duties in maintaining sanitation after an air raid or other wartime disaster. In some communities the health department may be inadequately staffed to provide sanitary supervision and inspection services in a war emergency. Under these circumstances, the Health Officer may select volunteer health deputies with experience or training in the fields of public health, sanitary engineering, bacteriology, chemistry, and related fields and may recommend their appointment in the Staff Unit of the Citizens Defense Corps. Deputies may be assigned by the Health Officer to supervise and inspect emergency activities and facilities, such as disinfection of fractured water mains, pasteurization of milk, and preparation and handling of food at emergency feeding centers. Health department officials and volunteers, in order to become members of the Staff Unit, must complete training in accordance with Regulations No. 3.

The Health Officer may prescribe additional technical training for those under him after their enrollment as members in the U. S. Citizens Defense Corps.

HOME CANNED FOODS AND BOTULISM

In view of the fact that the Association office has discovered much interest in thoroughly approved means for the prevention of botulism and with special reference to the current Victory Garden Program, the following bulletin of the California State Department of Public Health is published herewith, because it has the approval of those with wide experience in this field, including Dr. Karl F. Meyer, the Director of the George Williams Hooper Foundation of the University of California.

"Home-canned vegetables, fruits, fish, meats, and animal products can be eaten without danger of botulism—a highly fatal poisoning—if simple precautions are observed.

- "1. Never eat home-canned vegetables, meat, or fish, even in tiny amounts, without first boiling the food for at least 15 minutes after removing it from the container. This must be done because it is not possible to tell that the food is capable of causing botulism by looking at it or smelling it. If the food is poisonous, even the tiniest amount may cause death.
- "2. If in doubt about fruits, remove them from the container and boil them. The odors of decomposition will warn you.
- "3. Never eat any canned food which shows mold growth or appears in any way to be abnormal such as having a bad odor or coming from a bulged container.
- "4. Do not feed canned foods suspected of being spoiled to poultry, pets, or other animals.

"Botulism is caused by a poison, produced under certain conditions by the *Bacillus botulinus*. This *bacillus* is a spore which is present in the soil. It is transferred from the soil to food products. It is so small that it can be seen only with the aid of a microscope.

"Fortunately the poison is produced only by the germination of the *Bacillus botulinus* and the *bacillus* germinates only in the absence of air. For this reason, raw foods and cooked foods that have not been canned do not cause botulism. The airless interior of a sealed can or glass jar provides the ideal

condition for the reproduction and growth of the *bacillus* and the consequent production of the poison.

"The spores of *Bacillus botulinus* can be destroyed by high temperatures. Botulism is prevented in canning by heating the food to a temperature above boiling. This temperature must be maintained for a sufficient length of time to permit the heat to penetrate to the very center of the contents of the can. The temperature which is necessary and the duration of the heating depend upon the density of the food and the rapidity with which the heat is conducted through the food and the container. The temperature and the heating time vary with different foods and different containers.

"Commercial canners in California are licensed by the State Board of Public Health and use methods prescribed by the Board. An inspector is present in the plant during the canning of any food capable of causing botulism.

"Housewives who own steam pressure cookers and who have the technical knowledge concerning proper temperatures, and the period of heating required for different foods and different containers, may use this method of canning with safety. The University of California, Berkeley, issues a very complete bulletin of instructions entitled Home Canning, Circular 276.

"Many people believe that botulism is only caused by eating home-canned string beans and olives. This is not true. Cases recorded by the California State Department of Public Health involve 32 kinds of foods, including 18 vegetables, six different meats and cheeses, three kinds of fish and five varieties of fruit.

Illness from botulism usually occurs from 24 to 48 hours after the food has been eaten. This is very different from ordinary food poisoning due to spoilage, which usually occurs from 2 to 4 hours after eating.

"The symptoms of botulism are also different from other food poisoning. They include muscular weakness, disturbances of vision, loss of ability to swallow and talk. The pulse is rapid and the temperature below normal. There is rarely any pain or symptoms of indigestion. Death is due to paralysis which makes breathing impossible. Call a doctor as soon as the first symptoms are noticed. Prompt medical care can sometimes save the life of the patient."

U. S. FEDERAL SUBSIDIES FOR NURSING EDUCATION PASSED

On June 15 it was announced that the Bolton bill to provide more nurses

for military and civilian war training service through subsidized training and the establishment of a uniformed nurse reserve had been signed by President Roosevelt. Representative Frances P. Bolton of Ohio who sponsored the bill indicated that the law would now provide for a student war nursing reserve which is expected to reach an enrollment of 65,000 by the end of June, 1944. Students will receive free tuition, maintenance, and uniforms, and from \$15 to \$30 a month from the Public Health Service. They must agree to serve either in the armed services or in emergency civilian jobs. Administration of the corps will be under the Surgeon General of the Public Health Service. Funds in the amount of \$65,000,000 a year are expected to be devoted to implement the program.

HARD OF HEARING CHILDREN PROJECT APPROVED IN CALIFORNIA

It has been announced that Governor Warren has signed two bills passed by the recent Legislature making available to the State Department of Health \$26,500 for the examination of children by trained otologists to detect hearing difficulties. Other funds were made available to the State Director of Education for consultant services in connection with the education of hard of hearing children in areas where these services are not otherwise available.

These bills were designed to make possible to children in small cities and rural districts the same services that are available to children who live in larger cities. The bills were sponsored by the California Committee for Hard of Hearing Children, of which Conrad G. Selvig of Santa Monica is Secretary.

NEW YORK STATE UNDERTAKES POSTWAR PLANNING PROGRAM

The New York State Legislature has established a Postwar Planning Commission which, in cooperation with the

Division of Sanitation of the New York State Department of Health and the State Superintendent of Public Works, now has under consideration water supply and sewage disposal projects, and a variety of other structures, including municipal refuse incineration plants. More than 139 proposed sanitary projects are at the present time being considered.

A feature of the New York scheme includes an appropriation to assist municipalities, school districts, and district corporations in meeting the cost of the preparation of such plans. For all projects that it approves the commission is authorized to allocate an amount equivalent to one-half of one per cent of the cost of the project for the preparation of preliminary plans and, if these are approved, it may allocate an additional sum up to one and one-half per cent of the cost of the project as its share of the expenditure for final detailed plans.

JOHN M. DIVEN MEMORIAL MEDAL

Health News announces that Earl Devendorf, Assistant Director of the Division of Sanitation of the New York State Department of Health and State Water Coördinator of the New York State Mutual Aid Plan for Water Service, has been awarded the John M. Diven Memorial Medal by the Medal Committee of the American Water Works Association "in recognition of the most outstanding service to the American Water Works Association last year." The presentation was made on June 17 at a dinner meeting conducted in connection with the war conference of the Association in Cleveland, Ohio.

In making the award the committee pointed out that "Mr. Devendorf originated the mutual-aid program on a fully cooperative basis, bringing into the work a large number of members of the Association who are water works

executives in the state. Participating with these water works executives have been many engineers of the New York State Department of Health, who, to the degree that they have contributed to the Mutual Aid program, share in the honor conferred upon the recipient of this award. The development of the Mutual Aid program in the water works field has been a conspicuous activity in many states and is, in effect, the most outstanding service and advancement in the field of the year."

IDAHO PUBLIC HEALTH ASSOCIATION

The following new officers were elected by the Idaho Public Health Association at its June 3rd Annual Meeting:

President—W. V. Halversen, Ph.D., Moscow
Vice-Presidents—Stuart Robinson, Gooding
 Mrs. H. J. Maughan, Preston
 Mrs. Emma Clouche, Twin Falls
 H. B. Yearsley, Pocatello
 Mrs. R. L. Brainard, Wardner
Secretary—H. C. Clare, Boise
Treasurer—Lucy M. Higgins, Boise
Representative on the A.P.H.A. Governing Council—L. J. Peterson, Boise

ARIZONA PUBLIC HEALTH ASSOCIATION

New officers of the Arizona Public Health Association were elected as follows at a recent meeting:

President—H. L. McMartin, M.D., Phoenix
President-elect—Mary E. Caldwell, Ph.D., Tucson
Vice-President representing Public Health Nursing Section—Hazel Kandler, R.N., Tucson
Vice-President representing Sanitarians—O. W. Fowler, Phoenix
Vice-President representing Clerks—Parma Branscomb, Phoenix
Vice-President representing Laboratory Section—Marion Stroud, Phoenix
Secretary-Treasurer—Fred M. Ashley, Phoenix

A.W.V.S. STARTS SAFETY PROGRAM

The American Women's Voluntary Services is extending its wartime activities to include a safety program to be

known as the Safety Plan. Home safety and accident prevention are its objectives. The program will be conducted through the local units of the American Women's Voluntary Services in full coöperation with local safety organizations and other organizations that sponsor safety educational activities, such as the Parent-Teacher Associations, women's clubs, the boards of education, health departments, etc.

The members from the local units selected for this work are urged to take the Red Cross Home Safety Course and the program will be centered upon the types of accidents most common in the particular locality.

PUBLIC HEALTH ASSOCIATION OF NEW YORK CITY

The Seventh Annual Meeting of the Public Health Association of New York City was held at Hotel George Washington, New York, N. Y., May 12.

At the afternoon session the speaker was Elisabeth C. Phillips, R.N., Assistant Director of Field Practice, Henry Street Visiting Nurse Service. Her topic was "Great Britain in War Time."

At the dinner session the speaker of the evening was Professor Robert Hughes Parry, M.D., Medical Officer of Health of the City and Port of Bristol, England. Dr. Parry's topic was "Meeting the Wartime Health Problems of an English City."

The officers elected to serve until the Annual Meeting in 1944 were:

President: Leverett D. Bristol, M.D.
First Vice-President: Sol Pincus
Second Vice-President: Alfred E. Shipley, M.D.
Secretary-Treasurer: Frank Kiernan

Sol Pincus, Deputy Commissioner of Health of the City of New York, was continued as representative to the Governing Council of the American Public Health Association.

NUTRITION EXHIBIT OF CALIFORNIA ACADEMY OF SCIENCES

Robert C. Miller, the Director of the California Academy of Sciences, Golden Gate Park, San Francisco, has reported on the development of a nutrition exhibit built by the Academy partly from contributions made by the Northern California Public Health Association, and by the Western Branch of the American Public Health Association, which has been shown in Seattle, San Jose, Santa Barbara, Sacramento, Marysville and Palo Alto. Mr. Miller recently reported to Dr. Guy S. Millberry, Treasurer of the Western Branch A.P.H.A., that the contributions of \$420 toward the construction of this exhibit had been used by the Academy to supplement its own investment and to make possible an exhibit at the Western Branch meeting in 1942. Since June, 1942, the expenses of transportation of this exhibit have been paid by the agencies borrowing it. When the exhibit was not enroute it has been displayed in the Museum of the Academy in Golden Gate Park. The exhibit since its completion has traveled over 3,000 miles and at a conservative estimate has been seen by 150,000 people. It is available for showing throughout the western states.

Ann Wilson Haynes, Secretary of the Northern California Public Health Association, has reported that the Association has made its contribution to this exhibit from funds rebated to the affiliated society by the American Public Health Association. It is suggested that other affiliated societies which make definitive use of rebate funds will make their experiences available to the professions through the columns of the *Journal*.

DENTAL TRAINING FOR MEDICAL STUDENTS IN NEBRASKA

A program has been inaugurated at the College of Medicine, University of

Nebraska, to instruct medical students in aspects of dentistry from a public health standpoint. According to H. M. Wilbur, D.D.S., who is in charge, the fundamental aim is to help the medical student become aware of the dental problem and how this problem affects the practice of medicine. This program is carried out through the medium of lectures in which the student is presented with material to form a background for an understanding of the fundamentals of dental and oral pathology. This material is accompanied, expanded and fortified by opportunity for clinical observation in the dispensary and hospital.

The chief topic of discussion in the lectures is dental caries. Material is presented on dental anatomy, both gross and microscopic, tooth development, calcification and eruption, anomalies and deformities of the teeth, the clinical aspects of caries, factors influencing the localization of cavities, the epidemiology of caries, all as forming a background of the caries problem. A detailed discussion of the current theories of the etiology of caries is presented from a historical, experimental, and practical standpoint, and the details of the bacteriological examination of the patient's saliva as a diagnostic and prognostic procedure are included. The recent work on the influence of the association of fluorides in the drinking water on caries is discussed, together with other influences such as diet and nutrition, sunlight, and physical state.

The clinical exposure of the student is accomplished through assignments to the dental clinic in the dispensary where he observes examinations wherein the importance and significance of radiograms and bacteriological examinations are emphasized. He also observes routine dental procedures, such as prophylaxis, fillings, and extractions. An evaluation of the individual patient's dental status in the light of the medical

problem is made, both in the dispensary and in the hospital, so that the student may see the different aspects presented by ambulatory and hospitalized patients.

This program was made possible through the efforts of the Children's Bureau of the Department of Labor in cooperation with the Nebraska State Health Department. The dental director is a member of the Division of Maternal and Child Health of the State Health Department, which division is comprised of an obstetrician and gynecologist, a pediatrician, a nutritionist, a bio-chemist and a pediatric nurse. This unit works in close intercooperation, and the dental program is integrated with it in problems of maternal and child health. The clinicians are all full-time members of the teaching staff of the College of Medicine.

MARYLAND STATE PLANNING
COMMISSION COMMITTEE ON
MEDICAL CARE REPORTS

The Maryland State Planning Commission, of which Abel Wolman, Dr. Eng., Professor of Sanitary Engineering at Johns Hopkins University, is Chairman, has recently published the report of the Committee on Medical Care.

Among the conclusions and recommendations it is pointed out that in certain sections of Maryland some essential medical services are not available to the medically indigent. There has been a growing tendency for these persons to request medical care from state and county health departments and corresponding departments of welfare. Diagnostic and other medical services have been provided in some fields of medicine, especially tuberculosis, venereal, and mental diseases, by the state and county departments of health. At present there is no state or local department or agency legally responsible for making these services

available to the indigent, except in the limited fields of medicine with which state and county departments of health now concern themselves.

Among the recommendations it is proposed that a plan be adopted to provide medical care, including hospitalization, to the medically indigent, the program to be administered by the State Department of Health. The determination of the eligibility of applicants and the certification of them for care, as well as the payment of compensation to physicians and institutions, is to be a function of the state and county departments of welfare. It is proposed that the State Board of Health should establish a Council on Medical Care to formulate policies for the administration of the program. The Bureau of Medical Care should be established within the State Department of Health under a chief who should be a physician experienced in the field of medical care and appointed by the Director of the State Department of Health with the approval of the Council on Medical Care, serving on a full-time basis. The county health officer will administer the local program of the Council on Medical Care for the care of the medically indigent in homes, clinics and hospitals.

PROPOSED SOCIAL SECURITY ACT
AMENDMENTS OF 1943

Senator Robert F. Wagner on June 3 introduced in the U. S. Senate the Wagner-Murray Bill, S-1161, which provides for a unified national social insurance system of new scope, consisting of a national system of public employment offices, old age and survivors' insurance, permanent disability insurance, lump sum death benefits, protection of the social security rights of men and women in military service, unemployment insurance, temporary disability insurance and maternity benefits, unemployment allowances upon

termination of military service, and medical and hospitalization insurance.

According to Senator Wagner the bill covers broadly the major economic hazards of average people throughout their lifetime—loss of income in time of unemployment, sickness, permanent disability, and old age. It assures medical care and hospital service for the American people "while protecting the free choice by the patient of doctor and hospital and the free choice of patient by the doctor and the hospital." It would increase the old age benefit allowances for workers and their families and extend coverage to 15,000,000 persons now excluded, such as farm workers and domestic servants, employees of non-profit institutions, and the independent farmer, professional and small business man.

According to Senator Wagner the bill would create a unified system of social insurance with one set of contributions, one set of records and reports, one set of local offices, making for a more efficient administration, reducing the number of reports and the cost to employers, and simplifying the entire program for workers, employers, and the public. The bill extends to all the members of the armed forces upon their return to civilian life all the phases of insurance protection, whether or not they were covered or had accumulated benefit rights in previous years. This includes a special unemployment allowance for 26 or possibly 52 weeks up to a maximum of \$30 per week, depending on the size of the family.

Section 11 of the bill is concerned with medical care and hospital benefits and sets up a federal system of medical and hospital insurance for all persons covered under old age and survivors' insurance and for their dependents. Each insured worker and his dependent wife and children would be entitled to the services of a phy-

sician who was a general practitioner and, on the doctor's advice, to specialist, consultant, and laboratory services, including x-ray, appliances, eyeglasses, etc., and necessary hospital care. According to Senator Wagner "the bill contains various provisions to assure that medical benefits will be the highest quality that can be made generally available, will promote personal relations between doctor and patient, will emphasize prevention of disease, and will be adapted to the needs and practices of the community in both rural and urban areas."

The Surgeon General of the U. S. Public Health Service would administer the technical and professional aspects of the program, with financial and social insurance relationships to be the responsibility of the Social Security Board. Hospital care is limited to 30 days a year, with a possible maximum of 90 days. All qualified hospitals are eligible to participate and all illnesses are covered for hospital care except tuberculosis or mental disease. Insured medical care covers all necessary service, but limitations may be fixed later if necessary. Medicines required outside the hospital would not be provided, nor would dental care, home nursing, private hospital rooms, and certain other services. The Surgeon General is authorized and directed to administer grants-in-aid to non-profit institutions and agencies engaging in research or in undergraduate or postgraduate professional education. Such grants could be made for projects showing promise of making valuable contributions to the education and training of persons furnishing medical and hospital, disability, and related benefits, or of making valuable contribution to human knowledge with respect to the cause, prevention, or methods of diagnosis or treatment of disease or disability. The maximum sum available each year for such grants-

in-aid would be 1 per cent of the total expended for all benefits, exclusive of unemployment insurance benefits, or 2 per cent of the amount expended for medical care and hospitalization benefits, whichever is less.

LOCAL HEALTH SERVICE—A NEW APPROACH

"After a decade or two of slow going, the movement for full-time public health service has rolled up such momentum in recent years that it is no longer fantastic to plan definitely to extend it to the whole population of the United States. Last summer the American Public Health Association set up a Subcommittee on Local Health Units under the Chairmanship of Dr. Haven Emerson. This committee has recently reported that more than two-thirds of the population is already provided with full-time health service under city, county, or state auspices. There remain, however, more than forty million people without such service. In their interest the committee has begun a systematic mapping of the whole country to discover what additional facilities are needed and how they can best be disposed.

"The committee suggests that population units of 50,000 should be able to support a full-time health officer and an adequate health department staff, including an average of one nurse for each 5,000 persons. On this basis the country could be blanketed with approximately 1,100 units.

"This preliminary plan needs to be refined and adjusted to geographical details. The committee is in correspondence with state health officers to this end, and expects to employ a small research staff for which the Commonwealth Fund has made an appropriation. The upshot of this consideration should be a sound plan of campaign for the distribution of health service. The American Medical As-

sociation and the American Public Health Association have both given official approval to the extension of public health service and the time is ripe for orderly and more rapid progress.

"The Fund is also sharing with the American Public Health Association, through an April appropriation and staff collaboration, in the task of revising methods of evaluating current health performance. A scheme has been devised whereby current experience can be compiled and reduced to convenient statistical indices for the guidance of health officers who wish to gauge their local achievement in comparison with prevailing standards. This device, when it is in full operation, will carry forward the service performed hitherto by the older Appraisal Form for Local Health Work."—From *News Letter* of the Commonwealth Fund, June, 1943.

CALIFORNIA STATE FEDERATION OF LABOR REQUIRES BLOOD TESTS OF UNION MEMBERS

Lawrence Arnstein, the Executive Secretary of the California Social Hygiene Association, San Francisco, has pointed out that the Executive Board of the California State Federation of Labor in its session in Hollywood on June 12 recommended to its affiliates that member unions require each applicant for membership to have a blood test made before admission into the union, the result of the test to be a matter of strictest confidence between the examining physician and the applicant, and under no circumstances to be revealed to the union or to the employer, and to have no bearing upon the applicant's admission into the union. The board further recommended that unions make arrangements with local public health departments to make tests for applicants for membership who do not wish to go to a physician in

private practice. It was further recommended that assistance from the California State Department of Public Health and local public health departments and the California Social Hygiene Association be secured in conducting an educational program among the entire union membership.

Assisting Mr. Arnstein, among others, was Arthur Painter of the San Francisco Health Department who is assigned by the U. S. Public Health Service as educator.

SANITATION EXPERTS ON INTER-AMERICAN HIGHWAY

The press recently announced that a Commission of Sanitation Experts which is studying conditions along the route of the inter-American highway had arrived in Guatemala. Dr. John R. Murdock, chief of the mission, is accompanied by sanitary engineers Charles C. Spenser, Herbert E. Hargis, and Walter Dashiell. Special attention is being given to drinking water supplies, drainage and tropical diseases existing near the highway.

IMPROVEMENT IN THE TEACHING OF TROPICAL MEDICINE IN THE MEDICAL SCHOOLS OF THE UNITED STATES AND CANADA

The Association of American Medical Colleges is conducting a program to improve the teaching of tropical medicine in medical schools. The program was developed at the request of the Surgeons General of the Army and Navy and has the coöperation of the Division of Medical Sciences of the National Research Council, the Pan American Sanitary Bureau, the Office of the Coördinator of Inter-American Affairs, the United Fruit Company, the Army Medical School, Tulane University, and the U. S. Public Health Service. It is supported financially by the John and Mary R. Markle Foundation.

The operation of the program is in the hands of a committee of the Association of American Medical Colleges consisting of Dr. Malcolm H. Soule, University of Michigan, Dr. Hiram W. Kostmayer, Tulane University, and Dr. Henry E. Meleney, New York University, Chairman.

The first phase of the program provided an opportunity for each medical school in the United States and Canada to send two members of its teaching staff to attend an 8 weeks' course in tropical medicine at the Army Medical School or Tulane. The first courses began January 4, 1943. By the end of August, 83 instructors from 59 schools will have taken advantage of this opportunity.

The second phase of the program consists of the distribution of teaching material to medical schools. The Army Medical School has established a Distributing Center for parasitological and pathological specimens. This center also gives advice as to sources of lantern slides and motion picture films. The Office of the Surgeon General has made available its epidemiological information concerning tropical diseases and medical services in tropical countries throughout the world. It has prepared maps showing the distribution of tropical diseases. This material is in process of publication through the coöperation of the National Research Council and the Markle Foundation and will be distributed to the medical schools and other interested agencies and individuals. The Office of the Surgeon General of the Army also has available a limited number of copies of *Circular Letter 33 SGO* entitled, "Treatment and Control of Certain Tropical Diseases," for the use of medical schools.

The third phase of the program consists of providing an opportunity to instructors from medical schools for a

month of practical experience in tropical medicine in Latin America, principally in the Central American countries. Two instructors from each medical school are offered this opportunity. Fifty-eight instructors from 43 schools have been accepted for this program. The first group of 8 individuals spent the month of June in Central America, and subsequent groups will go monthly until the program is completed. The program consists of 3 weeks' residence at a hospital of the United Fruit Company, followed by 1 week of observation of the program of the local field unit of the Office of the Coördinator of Inter-American Affairs in the respective Central American countries. It is possible that other such centers for practical experience may be utilized in the future.

MISS LUGINBUHL APPOINTED TO
A.P.H.A. STAFF

Martha Luginbuhl began her work July 6 as research assistant to the Subcommittee on Local Health Units under the Committee on Administrative Practice in the headquarters office, 1790 Broadway, New York, N. Y. The subcommittee is under the Chairmanship of Haven Emerson, M.D., and is developing a plan for the extension of local health services to all parts of the United States, as outlined in the April issue of the *Journal*.

Miss Luginbuhl most recently has been statistical supervisor in the National Headquarters, U.S.O. She was a statistical assistant in connection with two studies of the Research Bureau of the Welfare Council, New York, N. Y., on a Health Inventory of New York and Chronic Illness in New York City. Formerly she was Director of Statistics, Records and Information in the United Hospital Fund of New York and was on the staff of the Public Health Relations Committee of the New York Academy of Medicine.

CLIFFORD W. BEERS DIES

Clifford Whittingham Beers, founder and secretary of the National Committee for Mental Hygiene and the American Foundation for Mental Hygiene, and a man internationally known in his field, died on July 9 in Providence, R. I., at the age of 67. Mr. Beers was best known for his autobiography *A Mind That Found Itself*, which was published in 1908, representing his own experience of a mental break. In 1908 he founded the Connecticut Society for Mental Hygiene, the first organization of its kind, which was followed by the establishment of similar organizations in about 25 states. The National Committee was founded in 1909.

Born in New Haven in 1876, Mr. Beers was graduated from Sheffield Scientific School, Yale University, in 1897. Yale conferred an honorary M.A. degree on him in 1922. At that time President Angell said that it "was for indomitable courage and devotion in turning to the enduring benefit of mankind experiences that have driven most sufferers to silence and seclusion."

Mr. Beers in 1928 founded the American Foundation for Mental Hygiene and was organizer and Secretary General of the First International Congress for Mental Hygiene, held in Washington in May, 1930. The second International Congress for Mental Hygiene in Paris in 1935 was also organized by him. In 1930 he had founded and become secretary of the International Committee for Mental Hygiene. The following year he established and became secretary of the International Foundation for Mental Hygiene.

While a student at Yale an older brother of Mr. Beers had been fatally stricken with epilepsy and fear that a similar fate awaited him was experienced with increasing force until he suffered a mental breakdown in 1900. An attempt to take his own life was followed by confinement in institutions

for the insane for three years. In spite of his surroundings his reason gradually returned and he resolved to do what he could to correct the evils of the age-old system of caring for the mentally ill. He even voluntarily provoked commitment to the violent ward of one hospital in order to gain first hand knowledge of the worst conditions that prevailed. After his release from confinement in 1903 he entered business life, but early decided to sacrifice his right to privacy as to his own experiences and, through the medium of a book, to lay bare to the world the abuses he had endured and to focus public attention on the problems of the care and treatment of that class of unfortunates in whose behalf he felt it his peculiar right and duty to speak.

DR. L. T. WEBSTER, EPIDEMIOLOGIST, DIES

Dr. Leslie T. Webster, a member of the Rockefeller Institute for Medical Research, who was known especially for his work in epidemiology, died in Scarsdale, N. Y., on July 12 of a stroke, at the age of 48.

Born in New York, Dr. Webster graduated from Johns Hopkins Medical School in 1919, following which he joined the staff of the Rockefeller Institute, becoming a member in 1934. Dr. Webster was largely responsible for the establishment in this country of the science of experimental epidemiology. He developed colonies of mice and other animals and watched the spread of communicable diseases through them. More recently he carried on extensive researches on rabies, devising tests for early diagnosis and for determining the potency of anti-rabic vaccines. Dr. Webster joined the American Public Health Association in 1935 and became a Fellow in 1940.

PERSONALS

Central States

M. BERNETA BLOCK, M.D., Director of

the Alger-Schoolcraft Health Department, with headquarters in Manistique, Mich., has accepted a position as Director of the Maternal and Child Health Service of the Territory of Alaska, with headquarters in Juneau. Prior to her appointment in February as Acting Director of the Manistique health unit, Dr. Block had been Regional Consultant in Maternal and Child Health in Lansing.

G. HOWARD GOWEN, M.D., PH.D.,* formerly associated with the Chicago Department of Health and the University of Michigan School of Public Health, entered military service in July, 1942, and is now serving as Major in the Medical Corps with the First Medical Laboratory in North Africa.

FREDERICK C. HANEY, M.D., has been named Commissioner of Health of Watertown, Wisc., succeeding HARVEY G. E. MALLOW, M.D., who has been commissioned a First Lieutenant in the U. S. Army Air Force.

HUGO V. HULLERMAN, M.D., M.S. P.H.,* has resigned as Deputy Commissioner of Health in the Peoria, Ill., Department of Health to assume duties on July 1 as Chief of the Division of Maternal and Child Hygiene with the Illinois Department of Public Health in Springfield.

COLONEL EDGAR ERSKINE HUME, M.C., U.S.A.,* has been announced as Chief American Health Officer for The Allied Military Government of Occupied Territory, in the organization attached to the United States Seventh Army in Sicily. Dr. Hume was recently at the Winter General Hospital, Topeka, Kans.

PHILIP D. MCGINNIS, M.D., has been appointed Health Officer of Joliet, Ill.

REUBEN F. REIDER, M.D., D.P.H.,† Passed Assistant Surgeon, Reserve, serving in Illinois on loan from the

* Fellow A.P.H.A.

† Member A.P.H.A.

U. S. Public Health Service, is the Illinois District Health Superintendent for the Counties of Coles, DeWitt, Douglass, Edgar, Macon, McLean, Moultrie, and Platt, with headquarters in Decatur. Dr. Reider replaces WILLIAM M. TALBERT, M.D.,† of Decatur, who has been granted a military leave from state service to enter the U. S. Navy.

FRED O. TONNEY, M.D.,† formerly of the Chicago Health Department and more recently of the Delta County Health Unit, Escanaba, Mich., has been appointed Health Director and Research Consultant to the Toledo Scale Company, at Toledo, Ohio, under a research grant from the Company to the Toledo Health Department.

JOSEPH D. WARRICK, M.D., has been appointed Health Officer of Sharon, Wisc., to succeed L. C. Kief.

EARL M. WATSON, M.D., Health Officer of Cass County, N. D., has been appointed Health Officer of Fargo, succeeding ELVIN L. SEDERLIN, M.D.,† who resigned recently to become Regional Health Officer of Valley City.

Eastern States

JAY I. BOXER, M.A., began work on July 1 as a member of the community health education staff of the Onondaga Health Association in Syracuse, N. Y. Mr. Boxer has served for the last 6 years as social investigator in the Welfare Department of Suffolk County, New York. The association's program covers tuberculosis, social hygiene, and several other sectors of the health field.

LEVERETT D. BRISTOL, M.D., DR.P.H.,* of Montclair, N. J., has been named to succeed J. LYNN MAHAFFEY, M.D.,† of Camden, as State Director of Health of New Jersey, for a term

of 4 years. Dr. Bristol is Health Director of the American Telephone and Telegraph Company, in New York, N. Y.

MATTHEW A. BYRNE has been appointed Secretary of the New York City Department of Health, to succeed FRANK A. CALDERONE, M.D., M.P.H.,* who recently was appointed Deputy Health Commissioner. The appointment was made on the 40th anniversary of Mr. Byrne's service in the Department. In his new position he will supervise the administrative activities of the department and will continue as a member of the personnel board.

WALTER CLARKE, M.D.,† Executive Director of the American Social Hygiene Association, New York, N. Y., has been appointed Clinical Professor of Public Health Practice at Harvard University, Cambridge, Mass. For the past 3 years, Dr. Clarke has served as a Lecturer, in the Harvard School of Public Health, on public health administrative practice as applied to the control of syphilis and gonorrhea.

ALFRED L. FRECHETTE, M.D., M.P.H.,† Secretary of the New Hampshire State Board of Health, Concord, has been called to active duty with the U. S. Public Health Service for duties in North Africa. MARY M. ATCHISON, M.D., M.P.H.,† Director of Divisions in the State Board of Health, has been appointed Acting Deputy Secretary.

MIRIAM R. HAHN, M.P.H.,† of Hamden, Conn., who completed her course at Yale in 1943, has been appointed Director of Health Education in the Kern County Department of Health, Bakersfield, Calif.

CHARLES S. MCKINLEY, M.D., of Scotch Plains, N. J., has been appointed Director of the Bureau of Industrial Hygiene in the West Virginia State Department of Health,

* Fellow A.P.H.A.

† Member A.P.H.A.

on the recommendation of the U. S. Public Health Service. He succeeds JOHN W. CROSSON, M.D., who recently resigned to become Industrial Consultant for Sharp & Dohme, of Philadelphia, Pa.

RICHARD NAUEN, M.D.,† recently of Ray Brook, N. Y., has been appointed Tuberculosis Control Director in the Cattaraugus County Department of Health, Olean, N. Y.; and in charge of the Rocky Crest Sanatorium, succeeding E. K. RICHARD, M.D., who has resigned to enter private practice.

DR. ELMER H. STOTZ, Director of the Chemical Laboratory at McLean Hospital, Waverly, Mass., and a member of the teaching staff in biochemistry of the Harvard Medical School, according to *Science*, has been appointed by the Board of Trustees of Cornell University as Professor of Agriculture and Biochemistry and Head of the Division of Chemistry at the New York State Experiment Station at Geneva, N. Y. The appointment becomes effective on August 1. Dr. Stotz succeeds DR. DONALD K. TRESSLER,* who resigned early in the year to enter the industrial field.

HAROLD C. STUART, M.D.,* Assistant Professor of Pediatrics and Child Hygiene of the Harvard Medical School and the Harvard School of Public Health, Boston, Mass., has been interned with other Red Cross personnel and diplomats and was recently at Baden Baden, Germany. Dr. Stuart went to Europe for the American Red Cross to serve as medical director of relief activities in unoccupied France and Switzerland. He was in Marseilles ready to leave for the United States in November, 1942, when the African campaign began and has since been interned.

THOMAS M. THOMPSON, M.D., M.P.H., of Philipsburg, Pa., District Medical Officer for District No. 9, consisting of Clearfield, Clinton, and Centre Counties, has been transferred to District No. 4, composed of Bucks and Montgomery Counties, with headquarters in Norristown. GEORGE R. GOOD, M.D., of Altoona, District Medical Officer for District No. 10, including Huntingdon, Blair, and Cambria Counties, will have temporary charge of District No. 9. Dr. Thompson succeeds the late HOWARD W. HASSELL, M.D., of Bridgeport.

Southern States

MINYARD D. INGRAM, M.D.,† of Dresden, Tenn., Health Officer of Weakley County for 14 years, has resigned to accept a similar position in Gibson County.

FRANCES C. MONTGOMERY, R.N.,* who since 1936 has been Director of the School of Public Health Nursing in the College of William and Mary, Richmond, Va., has resigned and will make her home in Florence, Colo. Previous to her service in Virginia, Miss Montgomery was Director of the Bureau of Public Health Nursing in the Alabama State Department of Health, Montgomery.

ROSCOE ROY SPENCER, M.D., Medical Director, U. S. Public Health Service, who recently has been serving as Assistant Chief of the National Cancer Institute, Bethesda, Md., according to announcements, has been appointed Chief of the Institute effective August 1. Dr. Spencer will succeed DR. CARL VOEGTLIN, who is retiring.

BRIGADIER GENERAL JAMES STEVENS SIMMONS,† A.U.S., Director of the Preventive Medicine Division, Office of the Surgeon General, U. S. Army, has recently received the honorary degree of Doctor of Science from

* Fellow A.P.H.A.

† Member A.P.H.A.

Duke University, Richmond, Va., at its commencement exercises.

Western States

E. L. BERRY, M.D., M.S.P.H.,† Director of the Idaho State Department of Public Health since February, 1940, has been appointed Superintendent of the State Hospital North, at Orofino, Ida., effective June 1. Dr. Berry will continue to serve as Director until a successor is appointed.

EARL H. COLEMAN, M.D.,† has been appointed City Health Officer of Fresno, Calif., to succeed the late CARLETON MATHEWSON, M.D. Dr. Coleman will serve on a part-time basis.

CONCESSA L. CRAVIOTTO, M.D., has been appointed Health Officer of Oroville, Calif., succeeding CHARLES BENNINGER, JR., M.D.

DONALD G. EVANS, M.D., DR.P.H.,* State Health Officer of Washington, has resigned to enter the private practice of pediatrics in Seattle, effective June 1. Dr. Evans is succeeded by LELAND E. POWERS, M.D., M.S.P.H.,† Health Officer, Tacoma, Wash.

C. R. FARGHER, M.D., M.P.H.,* Health Officer of Vancouver, Wash., has resigned and has been appointed Health Officer of Tacoma, succeeding LELAND E. POWERS, M.D., M.S.P.H.,† who becomes Washington State Health Officer.

JAMES L. FAULKNER, M.D., has replaced RUSSELL G. FREY, M.D., as Health Officer of Red Bluff, Calif.

DEAN ELTON HART, M.D., of Oakland, Calif., was appointed Health Officer of Emeryville, Calif., succeeding CHARLES NEWELL MELL, M.D., of Oakland.

DR. RALPH R. PARKER, Director of the Rocky Mountain Laboratory of the

U. S. Public Health Service, Missoula, Mont., has recently had the Doctorate of Laws conferred upon him by the Massachusetts State College, Amherst, Mass.

CURTIS W. WILDER, M.D., of Lewistown, Mont., has been named Health Officer of Fergus County, to succeed the late CHARLES C. WALLIN, M.D., of Lewistown. Dr. Wallin held simultaneously the position of County Health Officer and Lewistown City Health Officer and full-time School Physician. The two latter posts had not been filled at the time of this report.

Puerto Rico

GUILLERMO ARBONA, M.D., M.P.H.,* formerly in charge of the training of staff at the Rio Piedras Unit of the Puerto Rico Department of Public Health, was appointed in April head of the Department of Public Health in the School of Tropical Medicine at San Juan, which is operated coöperatively with Columbia University, New York, N. Y. Dr. Arbona is Secretary of the Puerto Rico Public Health Association.

Deaths

CLIFFORD WHITTINGHAM BEERS, founder and Secretary of the National Committee for Mental Hygiene and the American Foundation for Mental Hygiene, New York, N. Y., died on July 9, in Providence, R. I., at the age of 67.

GILBERT T. CREECH, D.V.M., since 1912 Veterinary Pathologist in the Division of Pathology of the U. S. Department of Agriculture, Washington, D. C., died on June 2, at the age of 63.

DR. HARRY B. MELLER, formerly Chief of the Pittsburgh Bureau of Smoke Regulation, 1920 to 1938, and Managing Director of the Mellon Institute Industrial Hygiene Founda-

* Fellow A.P.H.A.

† Member A.P.H.A.

tion, Pittsburgh, Pa., from its organization to his resignation in September, 1942, died June 27, 1943, at the age of 65. Dr. Meller joined the Association in 1930 and was a member of the Engineering Section.

LESLIE T. WEBSTER, M.D.,* of The Rockefeller Institute for Medical Research, New York, N. Y., died July 12, at his home in Scarsdale, N. Y., at the age of 48.

CONFERENCES AND DATES

American Congress of Physical Therapy—22nd Annual Scientific and Clinical Session. Palmer House, Chicago, Ill. September 8-11.

American Public Health Association—Wartime Public Health Conference and 72nd Annual Business Meeting. New York, N. Y. October 12-14.

American Public Works Association. Chicago, Ill. October 24-27.

American Society of Heating and Ventilating Engineers—50th Anniversary Meeting. New York, N. Y. January 31, February 1, 2, 1944.

American Water Works Association—Rocky Mountain Section—Denver, Colo. September 16-17.

Western Pennsylvania Section—Roosevelt Hotel, Pittsburgh, Pa. September 22-23.

Southwest Section—Hotel Biltmore, Oklahoma City, Okla. October 11-13.

Wisconsin Section—Plankinton Hotel, Milwaukee, Wis. October 19-21.

California Section—Biltmore Hotel, Los Angeles, Calif. October 27-29.

Federation of Sewage Works Associations—2nd Conference on Wartime Sanitation and 4th Annual Business Meeting. Chicago, Ill. October 21-23.

First National Congress of Public Welfare. Mexico City, Mexico. August 15-22.

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The Child as a Wartime Problem

ROBERT HUGHES PARRY, M.D., F.R.C.P., D.P.H.*

Medical Officer of Health for the City and Port of Bristol, England; Professor of Preventive Medicine, University of Bristol

ONE of the instincts we admire most in an animal is the one whereby the parent protects its young. There are no dangers which it will not face to guard them. This instinct is highly developed in the human race and upon this foundation has been built our social and medical effort to prevent wastage of young life. Some would say that our success in this direction is a measure of our state of civilization. I firmly believe so.

This war has taught us the importance of pooling our resources—I am thinking here not of nations, for which it is equally true, but of an old city of nearly half a million people in Great Britain, Bristol, and of the 110,000 families in that city. If they had never known it before, they discovered early in the war how dependent they were upon one another, how little they could depend upon their individual instincts and resources and how much strength there is in unity. This city, between June, 1940, and June, 1941, went through more than 500 "alerts." To the inhabitants of a target area at that

time, an "alert" meant a good deal of gunfire, indistinguishable in the dark from the sound of exploding bombs, and the possibility, at any moment, of a high explosive or incendiary bomb falling somewhere near. It is of the efforts of that community under the guidance of the State to protect its young, that I would speak to you. The measure of success attained will be fully written when this war is over, but I can say here, as a guide to you, that the infant mortality rate for 1942, after more than three years of war, after many parents and more homes had been destroyed or broken up, was one of the lowest in the history of the city and was under 40 per 1,000 live births.

The Lord Mayor of Bristol, 1940–1941 (Alderman T. H. J. Underdown) has written a brief account† of the blitzed City of Bristol and, for a description of a raid, I cannot do better than to quote from this record:

"The 24th was a typical November [1940] day of dull leaden skies with a light mist towards sunset. As darkness fell, the alert was given and by 6:30 the skies over the

* Guest of the American Public Health Association at 17 state and regional meetings during May and June, 1943.

† Bristol Under Blitz: The record of an ancient City and her people during the Battle of Britain, 1940–1. Bristol: J. W. Arrowsmith, Ltd., 1942.

centre of the city were brightly lit by flares dropped from enemy 'planes. Then the fiery attack was let loose with utter ruthlessness. Showers of incendiary bombs kindled and spread the conflagration. High explosive bombs whistled and screamed to earth. Many were of extremely large calibre and spread the raging fires from building to building until whole streets were ablaze. The flames appeared as one huge fiery furnace leaping high into the air and giving an intensity of daylight over a great part of the City. The scene presented a veritable volcanic cataclysm. Crashes of high buildings and the volumes of flame, as castellated church towers carried the fires to greater heights, added a touch of grandeur to this inferno of terrorism. Men, afar off, scores of miles distant, gazed with wonder upon the illuminated skies as though peering into a mirror to learn the fate of a blitzed city.

"But while Bristol burned her people were bravely fighting. The Regular Police Fire Brigade led the van and was more than extended even with the support of 1,000 Auxiliary Fire Service men, ninety per cent. of whom responded to the call of duty within thirty minutes of the air-raid warning. Soldiers and naval men also co-operated splendidly. The men fought a great fight against overwhelming odds. During the first hour 70 fires were reported, mostly in the centre of the City. Every available appliance of the fire-brigade was brought into operation throughout the night and well on into the following day. Firemen were frequently diverted from their fire-fighting to save the lives of citizens. In this rescue work one officer faced the task of saving from a Home 35 elderly women, many of whom were invalids. Another diversion involved the evacuation of 60 horses from their stables. But the men fought on, several paying the supreme sacrifice on the altar of duty.

"Damage to the mains caused a failure of water supply. The reserve water from tanks and reservoirs was soon exhausted. There remained the supplies from the Avon and the harbour with the use of fire-floats. Meantime, assistance had arrived from other areas. The Bristol Fire Services were reinforced by 77 Fire Brigades from neighbouring counties, with an addition of 20,000 feet of hose from Cardiff, Newport, Bournemouth and Plymouth.

"Air-raid Precaution Wardens and Fire Watchers, both men and women, coped with a deluge of thousands of incendiary bombs, often preventing the raiders from finding their targets in many parts of the City. Of these

brave wardens 19 men, 3 women and 2 messengers lost their lives. Other citizens, even children, bravely extinguished incendiary bombs which had fallen upon homes, churches and other valuable properties.

"At the centre the communication services of the A.R.P. functioned efficiently during the early stages of the raid. Reports came in from all the depots promptly, followed by action. But when the lighting failed the wardens and their staff were greatly handicapped. Graver danger soon threatened when fires spread from Union Street to premises adjacent to the A.R.P. Central Control. When the relentless flames quickly set a part of the Control ablaze a section of the staff was sent to the Emergency Control. Just as the remainder were about to set out a message was received that the fire at the Museum had spread to the University and that water in the basement was already inches deep. Faced with a terrible alternative, the A.R.P. Control bravely carried on at Central Control for over an hour, although the back and upper part of the building was in flames. With coolness and courage they held on at their posts of duty. One girl telephonist answered an enquiry and then added with a cheery voice, 'I'm afraid I can't say any more now. The flames are all around me!' Evacuation became inevitable. Then they made a hasty transfer in private cars and on foot through the streets of their burning and bombed city to the City Engineer's Office in Queen Square. There they functioned with improvised equipment and restricted accommodation through the remainder of the night."

"The Utility Services were greatly dislocated. In wide areas of the City the water supply was either totally cut off or at such low pressure that the higher levels could not be normally supplied. Water carts, both civic and military, conveyed adequate supplies for domestic use. Gas, electricity and the telephone system failed over many parts of the City. Dislocation of the sewerage system presented a difficult problem. A large number of unexploded bombs added to the difficulties of complete and prompt restoration of these public amenities. But with surprising promptitude the 'severed arteries' were restored. Efficient assistance was given to Bristol's reserve of labour by gangs from other towns and by the military forces. The Royal Engineers and Infantry rendered valuable help in demolition of dangerous ruins, site and street clearance, traffic control and diversion and first-aid repairs to houses.

Within a few days 2,000 men were engaged in repairs on a large number of the 10,000 houses damaged in the raid."

It may be said that there is no house in Great Britain which can be considered to be 100 per cent safe from air attack. It is not intended in this paper to discuss the effect of this upon morale, either of the people at home or of the fighting forces away from home, but one may say in passing that the justice of our cause has proved to be a remarkable stimulant in my country.

The appearance of enemy bombers near our homes made us consider:

A. THE SAFETY OF OUR CHILDREN

When children are at home their safety is bound up with that of the other occupants of the home. Our experience has been that the home, the ordinary brick cottage without strengthening and even without special protection inside it, is a remarkably safe place during the heaviest air raids. At a time when we did not have the various types of shelters that are now available, whole families emerged from their ruined house very little the worse for their experience. Casualties, especially among children, were far fewer than we expected. I need not tell you that the parents did all in their power to give the best protection they had to their children. This was brought out very clearly in an analysis made of casualties following one heavy night's raid. At that time about 50 per cent of the population had air raid shelters of some kind. On that same night nearly 10,000 houses were damaged, more than 400 beyond repair.

It is noteworthy that, whereas children under 16 years of age form about 20 per cent of the normal population of the city, on this occasion only 6 per cent of the casualties were children (see Table 1).

After standardization for age and sex distribution one could say that:

TABLE 1

| | Males | Females | Children under 16 | Total |
|-------------------|-------|---------|-------------------|-------|
| Killed | 117 | 90 | 22 | 229 |
| Seriously injured | 110 | 51 | 13 | 174 |
| Lightly injured | 189 | 49 | 10 | 248 |

1. Men took nearly double the risk of women and over three times the risk of children of being killed.

2. Men took nearly three times the risk of women and six times the risk of children of being seriously injured.

3. Conversely, were it possible for men and women to take the same precautions to protect themselves as were available for children, it may be assumed that the following casualties would have been avoided.

| | Males | Females |
|---------------------|-------|---------|
| From death | 2/3 | 1/2 |
| From serious injury | 5/6 | 1/2 |

In order to protect children during the daytime when they were attending school, shelters were erected at all schools in the city. In schools where there was sufficient accommodation available, strengthened basements or trenches, or underground steel shelters were the types used. In schools lacking the necessary space for this, brick surface shelters were erected in the school grounds. Accommodation has been provided in school air raid shelters for 45,452 children at a cost of about £250,000.

The great difficulty, of course, in regard to schools, is the question of dispersal of the children and, in order to avoid casualties, we lay great stress upon this point. In no instance will a shelter erected at a school hold more than 50 children (equivalent in superficial floor space to 33 adults); even then it would be a catastrophe if one of these places received a hit.

We have no remedy against the solitary bomber flying behind cover of the clouds and dropping a bomb on a crowded school without warning of any kind.

B. EFFECTS OF AIR RAIDS

With regard to the general effect of

"alerts" and air raids upon children, particularly upon the school child and upon his life, some interesting papers have been published.

In February, 1941, Miss Dunsdon, our educational psychologist, made a survey of 8,000 school children to assess the evidence of strain following air raids and she found that 4 per cent (300) showed some signs of strain, either purely psychological or psychosomatic. One hundred and twenty was the figure she gave as suffering from psychological symptoms. These occurred twice as frequently in the 5-7 year group of children as in the 11-14 year group in whom psychosomatic disturbances were more frequent. Considering the severity of the raids, it shows how remarkably stable children are. The Deputy Director of the Bristol Child Guidance Clinic—Dr. Frank Bodman—has published a paper under the title "War Conditions and the Mental Health of the Child" in the *British Medical Journal* of October 4, 1941.

To those of us who have had an opportunity of observing the reaction of children to air raids, it has become quite clear that not only have the children stood up to raids in a quite remarkable manner, but they undoubtedly have been an example to the grown-up people. I would go so far as to say that the children of my city have contributed a good deal to public morale by their high spirits and their refusal to be intimidated by raids. I remember hearing a rather charming story of two children in an air raid shelter in one of our worst raids, when a girl aged 8 was heard to say to her small brother aged 6: "If you don't keep quiet, you won't hear a bomb fall."

C. INTERRUPTION OF EDUCATION

A report upon the interruption of the education of the children of Bristol was prepared for his committee by G. E. Sylvester, Chief Education Officer.

Here are some extracts from his report:

"In the early days of raiding of Bristol, there was considerable interruption of education and the local authority was extremely cautious in bringing large numbers of school children together and exposing them to possible risks. All Bristol schools were closed on the outbreak of war, but were reopened for children over 7 years of age within about a fortnight; after another fortnight children between 5 and 7 were admitted, and a fortnight later children under 5 were readmitted to nursery schools and nursery classes. Because of shortage of shelter places, a double-shift system operated for a time at the end of 1939 and education was, therefore, on a half-time basis. Attendance at school was voluntary from the beginning of the war until May, 1940, when compulsory attendance was reintroduced. Even after the double-shift system was abolished, many children only attended part time because there was not sufficient shelter accommodation available.

"In the latter part of 1940, Bristol school children spent considerable periods of school hours in air raid shelters under conditions which made it next to impossible to carry on any form of education. In September, 1940, for example, during the battle of Britain, out of 21 school days, 'alerts' were sounded on 18 days 29 times and the actual duration of 'alerts' during school hours was 13 hours out of approximately 115 hours. In addition we should remember that considerable time was spent in getting to and from shelters and the excitement unsettled the children.

"The effect of long night raids of the winter of 1940 should also not go unnoticed. Children were tired the next morning, and if they came to school at all they were not in a fit condition to take part in the rigorous routine of school life. The difficulty

was partly met by an alteration of school hours and the later opening of schools in the morning, but there is no doubt that this factor of night raids also constituted an interruption of education."

D. JUVENILE DELINQUENCY

This leads me to mention the problem of juvenile delinquency.

1. *Nationally*—In the first twelve months of the war there was an increase nationally of 41 per cent in the number of children (under 14) found guilty of indictable offenses, and an increase of 22 per cent in the number of young persons (14–17) found guilty of such offenses. In the same period the increase of delinquency in the age group 17–21 was not more than about 5 per cent, and in the group 21 and over there was a decrease of about 2 per cent.

The increase in the volume of juvenile delinquency may be traced to a number of causes, including the absence of fathers on military service, the taking up of war work by mothers, the breaking up of home life owing to evacuation, the interruption of education owing to evacuation and the closing of schools in the early stages of the war, and the increased earnings of young people accompanied, for many of them, by a reduction in the facilities available in youth organizations, at any rate in the early days. In addition to these easily discernible causes, it would be unwise to ignore the effect of the excitement and unsettlement of the war, especially on adolescent boys.

2. *The local position*—In Bristol, the number of children found guilty of indictable offenses increased by 45.5 per cent in the first year of war, and the number of young persons by 5.5 per cent. There was a further rise in the second year of the war, but in 1941 there was a notable drop in the number of boy delinquents (both children and young persons).

From Mr. Sylvester's report:

"We do not wish to appear to minimize the seriousness of the increase in the volume of juvenile delinquency in the first two years of war, but we think it necessary to keep a sense of proportion in the matter. Close attention to the problem is very necessary, but its extent sometimes tends to be exaggerated and to be the subject of hasty generalisations which are not supported by the facts. The largest number of children and young persons found guilty of indictable offences in any of the last four years is 338 (1940–41). We estimate that the total number of children and young persons living in Bristol between the ages covered by these categories is about 50,000 and it will be seen that the proportion of these committing offences is not large in relation to the total number in the age group concerned. Moreover, the outlook for the young offender in the long run is very good, for statistics show that 90 per cent of the boys and girls who give trouble become useful citizens in life."

During the period of the war there has been in my city and, indeed, in Great Britain generally, a very great increase in what we call the "Youth Service." The Board of Education and the local education authorities have encouraged youth organizations, and in Bristol the number of boys in the membership of youth organizations has increased by nearly 200 per cent during the war, and the number of girls by more than 100 per cent. At the present time, more than 50 per cent of these boys and girls between 14 and 18 years of age are members of some form of approved youth organization. The movement is largely influenced by the ideal of service to the community and to other people. It is not too much to suggest that the decrease in the amount of juvenile delinquency at these ages during the war period can quite

definitely be associated with the growth of the Youth Service movements.

Our Child Guidance Clinic played an active part in sorting out cases and advising upon particularly difficult ones throughout this period. For their experience, I would refer you to a paper published in the *Lancet* of November 8, 1941, by Dr. Bodman and Miss Dunsdon under the heading "Juvenile Delinquency in Wartime."

Some of the local factors which have played a very important part in this question of juvenile delinquency, which I should like to mention, are the following:

About 30 schools were partially or completely put out of action. This affected more than 7,000 places of accommodation. In addition, several schools were temporarily put out of service.

Many of our younger male members of the teaching staff (189) are serving with the Forces—the fact of this large withdrawal of men teachers on the disciplinary training of boys must have considerable effect, particularly as these teachers were active in promoting out-of-school organized games and sports and were making an important contribution to the teacher/leader development of youth welfare centers, boys' clubs, and other youth organizations.

For many reasons too, the parents' outlook toward regular attendance in school seems to have been modified. One can well understand this mental attitude of many parents in view of the relatively less importance of education as compared with the safety and other matters in the wartime life of the child.

When all these facts are taken into consideration, it can be said that juvenile delinquency is not an outstanding result of war and air raids upon the City of Bristol.

E. EVACUATION

Bristol became an evacuation area at the end of January, 1941, and the first parties of children were evacuated about the middle of February. This followed urgent representation from the local authority's committees to the Ministry of Health. By that time we

had been having severe air raids—a total of 28 from June 25, 1940 (which was the first upon Bristol), until the end of February, 1941, with a large number of casualties.

AIR RAIDS ON BRISTOL, JUNE 25, 1940, END FEBRUARY, 1941

| | | | | | |
|-------------------|-------|---|-------|---|-------|
| Dead | 711 | } | 1,521 | } | 2,780 |
| Seriously injured | 810 | | | | |
| Slightly injured | 1,259 | | | | |

I can only speak of this problem of evacuation from the point of view of the evacuating authority. There is no doubt that this is one of the greatest social experiments ever tried in Great Britain, and the full story of the effect upon the evacuated children and upon the homes in the reception areas and upon the people in those homes remains to be told.* As an evacuating authority we had the great problem of trying to get large numbers of children transported in short spaces of time to less vulnerable localities.

I may be forgiven here for trying to give you a brief account of life in the city for several months preceding evacuation, when the city was subjected to severe bombing.

During these days shelters were extensively used. *Public shelters*, either brick surface shelters or trench shelters in public parks, etc., which were open for use to any member of the community, accommodated approximately 10,000 children every night. There was some overcrowding in this type of shelter in the early days of raiding and the children lost much sleep. This probably affected their education more than their health, for no great increase in any infectious illness was reported. When bunks were provided a number of mothers with children attended regularly every night whether an "alert" was sounded or not because they feared that if they did not stake out a regular claim to bunks and occupy them with

their families each night they might find, on arriving after the "alert," that their usual place had been taken by a stranger who had got there first.

The communal type of shelters, mostly brick surface shelters allocated to certain numbers of houses, or streets accommodated another 10,000 children, but only a small percentage of this number used them every night. Communal shelters were private, and allocated to groups of families. They were conveniently situated near the homes of these families and were only used to any large extent during actual raids.

Small shelters of the "Anderson" type were used by a large part of the population. In many housing areas this type of shelter was in common use, and it was the practice in these areas to put children to sleep in them regularly each night at "black-out."

Under these circumstances, the routine of the home had been greatly disturbed, the "alerts" usually sounded in the early evening, just at bath time. This part of the child's daily routine, therefore, either completely disappeared or was very much modified. The expected results followed—head vermin became prevalent. The problem of head vermin was very much eased by the use of Lethane (384 special). This is a mixture of organic thiocyanates in 50 per cent of highly refined petroleum oil. (The principal toxic ingredients are the beta-thiocyano-ethyl esters of a mixture of higher fatty acids and beta-butoxy-beta thiocyanodiethyl ether). It is strongly insecticidal and has no toxic effects for the users. Of great value for all types of infestation, it has been found very effective in the treatment of pediculosis capitis and for this purpose is prepared with liquid paraffin as *Lithane Brilliantine*. This preparation is massaged into the scalp thoroughly and the hair is combed twice daily for a week, using a fine steel comb. Lice are killed instantaneously and the worst

cases require only two applications. This treatment is the best we know for pediculosis capitis in school children and never seems to fail.

Well, these were the children that were evacuated. In one day we succeeded in evacuating 6,370 children from elementary schools to Devon and Cornwall. We undertook to see that all these children were thoroughly inspected and cleansed and equipped with proper clothing before they went. The task of inspecting, cleansing and equipping was undertaken during the week prior to evacuation. The task was no small one. The incidence of uncleanness, scabies, impetigo, and pediculosis was higher than at any time previously, and all of these conditions had to be dealt with during the one week prior to the departure of the children. Moreover, to make the problem harder, these 6,370 children were located not in one but in twenty schools.

All of them received a complete inspection. The first took place four to six days before leaving the city, and the condition of each child was recorded on a special card. Special attention was given to cleanliness, verminous and skin conditions, infectious states, and the difficult child was indicated—the bedwetter and the child with behavior problems—as far as these could be ascertained.

The routine of this preliminary inspection was organized on the "Survey" system. Thirty-four school nurses and health visitors gave assistance to the five available school medical officers, and clerical help was provided by the teachers. Sometimes three or four of the smaller schools had to be covered by the same group of workers in one day, and for this the team was transported from school to school in casualty service vehicles.

Each child was undressed and completely inspected by a nurse. Upon the slightest suspicion of defect the child

was seen by a doctor at a separate table and the condition was more completely assessed. In this way 20 per cent of the children were labelled for treatment. Then the task of remedying the defects had to be accomplished. This was started immediately. Skin conditions, such as scabies and impetigo, and minor ailments were referred to local clinics for treatment. The normal routine of these clinics was temporarily suspended so as to give all affected children a chance of being cleared, and the treatment was active and thorough, so that the large majority were cleared within a week.

Problem children were set aside so that separate arrangements for evacuation, such as into hostels, could be made.

Head lice were the main difficulty. Approximately 15 per cent of the children, ranging from 3 per cent to 20 per cent according to the school locality, were found to be infested with head lice to a greater or lesser degree. It was realized at an early stage that separate arrangements would have to be made for the mass delousing of these children and for this purpose nurses of the Civil Nursing Reserve, "standing by" between night raids, were recruited. These volunteers, fifty in number, underwent a brief period of instruction before starting on the heads. A high standard was set. No child was to be allowed to depart with a single nit. Heroic measures were sometimes necessary in the worst cases but no verminous child left Bristol.

The final inspection took place within 24 hours of departure and was conducted on the same principles. During this inspection particular attention was paid to cleanliness, and to the children found defective at the preliminary examination. As a result of these examinations only one-half of one per cent of the children were considered unfit to travel, and most of these were cases of

scabies that could not be cleared in time. The task was completed within a week.

Altogether 21,000 children were evacuated from Bristol during the succeeding six months; 14,000 under arrangements made by the local authority, and 7,000 to billets secured privately by their parents. Of this number, a total of 8,000 still remain out of the city.

Outstanding among the lessons learned from this inspection were the extent to which shelter life can intensify all the problems of infestation, and the extent of the effects of even a temporary disruption of the social care normally given to school children.

All children who were not properly clothed were provided with all the necessary articles before they were evacuated. During the whole time that they are away continual watch is kept to see that they are adequately and suitably clothed, and if the parents are unable to provide what is necessary, the local authority supplies the need. I make special reference to this because we in Bristol recognize the tremendous debt we owe to the American organizations which have so kindly sent such generous gifts of clothing for our children. I would assure you that these are all well used and most gratefully appreciated.

F. RESIDENTIAL NURSERIES

What has been said about evacuation applies mostly to children over 5 years of age. We still had the problem of the children under 5. For obvious reasons it would be impracticable to expect that they could be billeted out. The only possible way of dealing with them was to take over country mansions and establish residential nurseries. A considerable amount of work was involved in obtaining the necessary accommodation and in rendering it suitable and equipping it for use as a

nursery. Some of these nurseries were administered under the supervision of a head teacher (as a residential nursery school) with a resident nurse adviser. Into these nurseries, the children aged 2-5 years were evacuated. Some were established as residential nurseries under a trained nurse-matron. The children under 2 years of age were evacuated to nurseries under the supervision of trained nurses and a deputy with nursery attendants working under them. The units were mostly of 30/40 children. Arrangements were made for medical supervision by local general practitioners. At present (March, 1943) there are 16 residential nurseries with a total accommodation for 473 children.

G. HOLIDAY SCHEME

The delay in operating the scheme for children under 5 years of age resulted in great strain being placed upon the mothers who had children of this age in the city during the "blitz," and in the spring of 1941 the City Council approved a Holiday Scheme for mothers and children. By this time, Bristol had suffered very badly and the more fortunate adjacent country areas were very sympathetic toward the citizens. Prominent people in these areas helped in the scheme and mothers and children were sent for a fortnight into the homes of families in these adjacent areas. Some towns (like Sidmouth, Devon) undertook to bear the cost involved; otherwise the Lord Mayor's War Services Fund to which American citizens have many times so generously given, helped to defray the expense. In one area a large camp was organized where mothers and children spent part of the summer of 1941, and some of the Oxford colleges were also used as guest houses. To the end of February, 1943, 6,208 people were sent away under this scheme. Every person sent had to have suffered as result of raiding.

H. PRESENT PROBLEMS

I have already mentioned that one of the results of the war is that the young fathers have nearly all disappeared from the city. Those that remain are employed strenuously on war duties and in any case the father is not able to do much in the way of supervision of his children. It is a peacetime problem of great importance to know what to do with the children when the mother falls ill and the home cannot depend upon friends and relations. Friendship comes to the rescue quickly in case of illness, but it cannot be strained too much. We know, for example, that many a mother has left the sanatorium before treatment is completed because her children at home have given too much trouble to friends and relations. Many husbands in peacetime have had to stay away from work because there was no one else to look after the child when the mother was ill. This has been a severe drain upon the family exchequer, often resulting in poverty. In wartime this same problem has been vastly accentuated and there appears to be but one solution—the establishment of residential nurseries by local authorities. The demand for these has therefore increased considerably as the direct result of the war, and every effort is being made in Bristol to provide this accommodation.

I. WARTIME NURSERIES

Another urgent problem today is how to care for children under 14 years of age while the mother is at work and away from home. In order to face this problem, and the growing need for more women on work of national importance, the Government have instructed local authorities to establish wartime nurseries. Here children under 5 years of age may be taken by a mother on her way to work and collected on her return in the evening. For a small pay-

ment the children are cared for and receive all their meals. So far (March, 1943) we have prepared accommodation for about 750 children in these nurseries in Bristol.

J. DAILY GUARDIANS SCHEME

It became clear that the normal rate of provision of wartime nurseries would not meet the problem, for mothers were quickly drafted to industry and munitions. In the late months of 1941, a scheme was devised which would allow for the greatest possible release of women for war work and at the same time take into account the mother who could not leave her home. Under this scheme of Registered Daily Guardians, a woman who cannot leave her own home can register as a "daily guardian." She agrees to take into her own home one or more children under 5 years of age (according to her accommodation) and to care for them each day while their own mothers are at work. Each "guardian" is visited and approved by the local authority, and the Ministry of Labour makes a payment to the guardians. The scheme has gained popularity and runs smoothly in Bristol where at the present time over 200 children under 5 years of age are in the care of "daily guardians." Contact is usually first made between the Ministry of Labour and the local authority, but in many instances the mothers concerned make their own arrangements and then come forward for approval and payment.

K. SCHOOL CANTEENS

The provision of wartime nurseries and the organization of the "Daily Guardians" scheme do not cover the whole of the problem, however—there remains the problem of the child of school age. In an effort to help in its solution, the Bristol Education Committee commenced a scheme whereby every child in an elementary school can

obtain $\frac{1}{2}$ pint of milk each mid-morning, and can obtain a hot midday meal. Meals are not available at every school in the city, but arrangements have been made so that the children from the schools lacking the necessary accommodation can quickly go to a central school for their meal. The teaching profession in the city is supporting this scheme by adding to its responsibilities the supervision of the children in the middle of the day. The Bristol Education Committee is at present bringing into operation a big scheme to increase the supply of meals in school canteens. We hope that the effect of this will be to increase the number of children taking a midday meal at school from 4,000 per day, which is the present figure, to something like 12,000 a day.

L. PLAY CENTERS

The provision of a midday meal for all elementary school children was a step toward the solution of the vast problem of the care of the school child, but it could not cover the after-school hours, when mother and/or father is still at work, nor could it cover the holiday period.

In eighteen centers of Bristol at the present time "youth welfare centers" are established where boys and girls can remain to gain both knowledge and recreation for a couple of hours following afternoon school. Such subjects as arts and crafts and physical training are taken.

This year the Bristol Education Committee has made provision for the opening of playing fields during the summer months, where boys and girls can spend their evening leisure time in healthy exercise and allow their mothers to work undisturbed by worry as to their welfare. The playing fields are available for all children. Should the weather be wet, arrangements are to be made for certain schools to be

opened in the evening hours as "play centers" and "youth welfare centers." To these only the children of war workers will be allowed to come. The centers are staffed by paid officers of the Education Committee.

It has been my purpose in this paper to show how public health authorities in Britain, while concentrating every effort on the immediate task, have succeeded in making provisions for the care of children. In peacetime it hardly seems necessary to draw atten-

tion to the need for protecting the life of a child and the development of its health. In wartime, however, life appears too cheap, so many young adults developed with such care are slaughtered on the field of battle and, in modern warfare, even mothers and children in their own homes. It would be easy therefore to divert all energy and material resources from any long-time policy. Only history can judge the measure of our success in keeping the balance steady.

Laboratory Examination of Eating and Drinking Utensils*

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IN recent years public health authorities have been giving increasing attention to the proper cleansing and subsequent handling of glassware, dishes, and other utensils that are used in establishments that serve food and drink to the public, and various procedures have been developed here and there for the laboratory examination of such equipment. Attention has centered on the examination of drinking glasses, cups, forks, and spoons, because it is these utensils that come in contact with the mouths of users. Plates and other utensils, however, are sometimes examined; and it is obvious that if contaminated cups and drinking glasses are washed in insufficient water, or in water inadequately heated, and other utensils are washed in the same water, the whole may become contaminated.

The term "sanitization" has been coined to apply to cleansing and handling of eating and drinking equipment. Methods and proposed standards for the examination of the efficiency of sanitization in restaurants, soda fountains, bars, and similar establishments are, to date, only tentative, and the purpose of the present study was to make some contribution to the subject.

LITERATURE REVIEW

A committee of the American Public Health Association¹ proposed a procedure for the bacteriological examination of eating utensils. The principal features of the test were: the multiple spoon test, in which spoons are shaken in sterile salt solution; the multiple glass test, in which glasses are swabbed with damp swabs and the swabs agitated in tubes of sterile salt solution; the multiple plate test, in which measured areas of plates are swabbed with damp swabs that are then agitated in sterile salt solution. All resulting suspensions are plated in the usual way. No mention is made of the time that suspensions may be held before plates are made.

Among the authors who have reported investigations of methods for evaluating the sanitary condition of eating and drinking utensils are Fellers, Levine, and Harvey,² Krog and Dougherty,³ Mallmann,⁴ Speck and Black,⁵ and Ward and Dack.⁶ A compilation of procedures was published by the Public Health Committee of the Cup and Container Institute.⁷ This compilation includes some of the publications mentioned above and also some others, among them being methods used in several municipalities.

Most of the procedures mentioned make use of dry swabs as such, dry swabs moistened in sterile fluid, or

* Contribution No. 475 of the Massachusetts Agricultural Experiment Station.

swabs sterilized in fluid. The general routines call for shaking or for rotating the swabs in a suspending fluid. Then the suspension is plated. In a few instances swabs are also streaked on special media for the detection of special groups of bacteria.

The most commonly used suspending fluids are sterile distilled water or sterile physiological saline. Hucker, et al.,⁸ in a report on food utensil sanitation, employed a "phosphate buffer solution," and the procedure of the New York State Department of Health⁹ specifies that Butterfield's phosphate solution¹⁰ shall be used. Standard nutrient agar is the most frequently used medium. Hucker⁸ used a medium containing tryptone, sucrose, gelatin, yeast extract, and K_2HPO_4 . The procedure in use at Dayton, Ohio, employs dextrose agar, and tryptone glucose extract agar is used in Springfield, Ill. In some instances special media are used in addition to the plating medium. Fellers, Levine, and Harvey streaked swabs on Loeffler's blood serum in an effort to isolate "pathogens," and Ward and Dack used veal infusion agar for *Eberthella typhosa* and *Staphylococcus aureus*, and injected guinea pigs to test for *Mycobacterium tuberculosis*. The presumptive test for the coliform group of bacteria has been used in some technics.

In addition to the swabbing technic, Hucker,¹¹ and Walter and Hucker,^{12, 13} have reported the use of a "contact plate" method in the place of swabbing methods for rapid tests.

Few of the procedures give any directions as to the length of time that may be permitted to elapse between swabbing and plating. Fellers, Levine, and Harvey state that swabs should be returned to the laboratory within 2 hours after the swabbing; the procedure employed at Washington, D. C.,⁷ permits 3 hours to elapse; the Michigan Agricultural Experiment Station

procedure states that swabs should be returned to the laboratory "immediately." The Standard Methods tentative procedure does not mention the time factor.

The list of procedures referred to here is not intended to be complete, but rather to give a cross-section view of those in common use. All are more or less tentative and changes may be expected as new information on the subject becomes available.

TYPES OF SWABS

The experiments of the first series were concerned with the relative efficiency of damp and wet swabs for removing bacteria from contaminated drinking glasses. Dry swabs are specified in some procedures, and they could be of use in swabbing moist surfaces. However, in practical inspection, most if not all of the utensils swabbed would be dry, and a dry swab obviously would be ineffective. At the beginning of this investigation dry swabs were used, together with the moist and wet swabs. It soon became evident that the dry swabs were inefficient for removing bacteria from dry utensils, so their use was discontinued and no results appear in the tables.

Swabs were made by twisting absorbent cotton onto wood applicator sticks. Two kinds of swabs were used in the experiments; *damp swabs* that had been moistened, but not saturated, with distilled water before they were sterilized, and *wet swabs* which were sterile dry swabs dipped into sterile distilled water or other suspending fluid just before they were used. Excess fluid was removed from the wet swabs by pressing them against the wall of the container before they were removed from it. All swabs and suspending fluids were sterilized in an autoclave at 15 pounds steam pressure for 15 minutes. For the wet swabs it was necessary to sterilize swabs and fluid sepa-

rately and to dip the swabs just before they were used, because when the swabs were sterilized in the fluid the sticks became so limber that it was impossible to exert the pressure necessary to remove the excess fluid from the swab or to remove bacteria satisfactorily from the surface of a glass. The use of wire instead of sticks would remove this difficulty, but sticks were preferred because it was found that the best way to remove the bacteria from the swabs was to break the sticks just above the cotton with sterile forceps and drop the swabs into containers of sterile suspending fluid.

In swabbing drinking glasses the swabs were held in the fingers as near to the cotton as possible without contaminating the swab. After swabbing was completed the sticks were broken and the swabs were dropped into bottles containing 100 ml. quantities of suspending fluid. The bottles were shaken until the cotton fluffed out, and then suitable dilutions were made and plated. Plates were incubated for 48 hours at 37° C. and then counted. The procedure for making and using the swabs remained constant through the study here reported, and standard procedure was employed in making plates. The suspending fluid used was varied as indicated later. Nutrient agar was used for plating until another medium was substituted as indicated in the text.

In the first experiment straight-sided

flat-bottomed drinking glasses of about ½ pint capacity were employed. These are referred to as glasses. They were sterilized and cooled, and then were dipped into a bacterial suspension to a depth of about ½ inch and rotated to insure complete wetting of the rims. They were then placed in a sterile rack and allowed to dry, and were protected from air contamination while they were drying. The organism employed was a strain of micrococcus isolated from a glass that had been used for drinking. The bacterial suspension was prepared by inoculating sterile nutrient broth and incubating for 24 hours at 37° C.

In this experiment sterile distilled water was used for dampening or wetting the swabs and for the suspending fluid. Glasses were dipped separately into four different suspensions of the micrococcus. These suspensions are designated in Table 1 as trials 1 to 4, inclusive. The glasses were allowed to dry, and some in each group were swabbed with two successive damp swabs and an equal number with two successive wet swabs. The second swab was used in each case to recover bacteria which had been missed by the first swab. Counts from the first swabbings were calculated as percentages of the respective total counts of both the first and second swabbings.

The total counts from the different glasses varied even with the same type of swab, probably because it would hardly be expected that contamination

TABLE 1

Comparison of Counts from Damp and Wet Swabs Used for Swabbing Drinking Glasses—First Counts Calculated as Percentages of Totals

| Trial | Counts from Damp Swabs | | | | Counts from Wet Swabs | | | |
|--------------------|------------------------|-----|--------|----------|-----------------------|-------|--------|----------|
| | 1st | 2nd | Total | Per cent | 1st | 2nd | Total | Per cent |
| 1 | 8,400 | 600 | 9,000 | 93 | 7,800 | 600 | 8,400 | 93 |
| 2 | 2,000 | 200 | 2,200 | 91 | 14,700 | 200 | 14,900 | 99 |
| 3 | 11,000 | 980 | 12,180 | 92 | 34,500 | 1,100 | 35,600 | 97 |
| 4 | 9,100 | 800 | 9,900 | 92 | 2,750 | 320 | 3,070 | 90 |
| Average Percentage | | | | 92 | | | | |

Note: Counts represent number of bacteria per ml. of suspension.

would be uniform. The percentage of the total for each glass recovered by the first swabbing was nearly the same for the two types of swabs. This suggested that the two types were about equally effective.

The possibility existed, however, that the damp swab did not remove as many bacteria as did the wet swab on either the first or second swabbing. If that were true, the apparent equality of the two methods in the first experiment would be misleading. In order to compare the results when damp swabs were followed by damp swabs on one series of glasses, and by wet swabs on another series, 24 sterile glasses were dipped into a suspension of the same micrococcus used before and dried. Twelve of the glasses were swabbed with three successive damp swabs each, and each of the other 12 with a damp swab and then with two successive wet swabs. Results are shown in Table 2.

counts for the first swabs averaged 94 per cent of the totals, and when a damp swab was followed by two successive wet swabs the average for the first swabs was only 80 per cent of the totals. These data indicate that, when only one swab is used per glass, as would be the case in practical inspections, the wet swabs would be substantially more efficient than the damp swabs in removing bacteria from contaminated surfaces.

PERCENTAGE OF ORGANISMS RECOVERED WITH WET SWABS

Another trial was made to determine as nearly as possible the percentage of organisms that could be recovered from glasses with wet swabs. A bacterial suspension was prepared as before and equal measured quantities were spread on the rims of glasses by means of a sterile capillary pipette. The glasses were allowed to dry and then swabbed

TABLE 2

Relative Efficiency of Damp and Wet Swabs as Indicated by Counts from Glasses

| Three Successive Damp Swabs—Count for First Swabs Calculated as Percentages of the Totals | | | | | | One Damp Swab Followed by Two Wet Swabs—Counts from First Swabs Calculated as Percentages of Totals | | | | | |
|---|----------|----------|----------|---------|----------|---|----------|----------|----------|---------|----------|
| No. | 1st Swab | 2nd Swab | 3rd Swab | Total | Per cent | No. | 1st Swab | 2nd Swab | 3rd Swab | Total | Per cent |
| 1 | 50,000 | 4,000 | 630 | 54,630 | 92 | 13 | 125,000 | 14,600 | 1,510 | 141,110 | 89 |
| 2 | 90,000 | 3,000 | 420 | 93,420 | 96 | 14 | 59,000 | 11,900 | 950 | 71,850 | 82 |
| 3 | 50,000 | 1,000 | 150 | 51,150 | 98 | 15 | 58,000 | 4,800 | 310 | 63,110 | 92 |
| 4 | 110,000 | 930 | 210 | 111,140 | 99 | 16 | 133,000 | 13,700 | 1,460 | 148,160 | 90 |
| 5 | 114,000 | 6,700 | 440 | 121,140 | 94 | 17 | 109,000 | 26,900 | 1,720 | 137,620 | 79 |
| 6 | 142,000 | 9,300 | 370 | 151,670 | 94 | 18 | 164,000 | 18,900 | 1,460 | 184,360 | 89 |
| 7 | 171,000 | 10,300 | 1,090 | 182,390 | 94 | 19 | 30,000 | 5,700 | 410 | 36,110 | 83 |
| 8 | 112,000 | 11,100 | 1,400 | 124,500 | 90 | 20 | 37,000 | 27,100 | 820 | 64,920 | 57 |
| 9 | 114,000 | 18,400 | 620 | 133,020 | 86 | 21 | 94,000 | 24,100 | 2,330 | 120,430 | 78 |
| 10 | 108,000 | 8,600 | 3,900 | 120,500 | 90 | 22 | 48,000 | 25,600 | 2,380 | 75,980 | 63 |
| 11 | 240,000 | 10,200 | 630 | 250,830 | 96 | 23 | 29,000 | 9,200 | 1,080 | 39,280 | 74 |
| 12 | 69,000 | 1,050 | 120 | 70,170 | 98 | 24 | 22,000 | 3,600 | 280 | 25,880 | 85 |
| Average Percentage | | | | | 94 | Average Percentage | | | | | 80 |

Note: Counts represent number of bacteria per ml. of suspension.

Again the total counts from the different glasses varied and comparison means little. The significant factor is a comparison of the counts from the first swabbings with the respective totals. Table 2 shows that when three successive damp swabs were used the

with one wet swab each, and the resulting suspensions were plated as in the preceding experiment. At the same time several portions of the suspension, each equal to the amount spread onto the glasses, were plated. The average of these counts was taken as 100 per

cent and the counts from the glasses were calculated as percentages of this average. Results are shown in Table 3.

TABLE 3

Counts from Glasses Inoculated with Bacterial Suspension and Swabbed with Wet Swabs—Counts from Swabs Calculated as Percentages of Count from Suspension—33,900

| <i>Glass No.</i> | <i>Count</i> | <i>Per cent</i> |
|--------------------|--------------|-----------------|
| 1 | 27,700 | 82 |
| 2 | 35,700 | 105 |
| 3 | 29,800 | 88 |
| 4 | 34,800 | 102 |
| 5 | 26,400 | 78 |
| 6 | 32,900 | 97 |
| 7 | 29,200 | 86 |
| 8 | 22,000 | 65 |
| 9 | 27,900 | 82 |
| 10 | 24,500 | 72 |
| 11 | 25,500 | 75 |
| 12 | 26,100 | 77 |
| Average Percentage | | 84 |

Note: Counts represent number of bacteria per ml. of suspension.

The counts from the different swabs varied. While it is improbable that the inoculations on the glasses contained uniform numbers of bacteria, the procedure should be indicative of the efficiency of the swabs in recovering bacteria from glasses and utensils sufficiently to indicate whether or not the sanitization of these articles had been satisfactory. Some of the counts from glasses were approximately equal to the average from the suspension, the lowest recovery was 65 per cent, and the average was 84 per cent. This result indicates that if a representative number of glasses or other utensils are swabbed in any eating place, the result should make possible a practical evaluation of the sanitizing practices of the establishment.

FLUIDS USED TO WET SWABS

In the experiments reported up to this point, sterile distilled water was used to moisten or wet the swabs. Another experiment was done to determine the effect of using other fluids to wet the swabs. Three fluids were used:

sterile distilled water, sterile tap water, and sterile physiological saline. Three series of swabs were wet with these respective fluids. Glasses were dipped into a bacterial suspension and allowed to dry. Then they were swabbed and the resulting suspensions were plated as in the preceding experiments. Two successive swabs were used on each glass and the count from the first swab in each instance was calculated as a percentage of the total of the two counts. The average of the percentages of bacteria recovered by the first swab for each fluid was as follows:

| <i>Wetting Fluid</i> | <i>Average Percentage recovery on First Swab</i> |
|----------------------|--|
| Distilled water | 95.5 |
| Tap water | 95.8 |
| Physiological saline | 95.6 |

These results indicate that no one of these agents has any advantage over the others for the wetting of swabs.

SUSPENDING FLUIDS

It is obvious that plates should be made as soon as possible after glasses or other utensils have been swabbed, and some of the procedures in use or recommended specify that not more than 2 hours, or 3 hours at most, shall elapse between swabbing and plating. In the practical inspection of establishments serving food and drinks to the public it may happen that a considerably longer time will elapse, particularly if an inspector does his own laboratory work, as is often the case in smaller communities. He might spend a morning making inspections and taking samples, and do the plating in the afternoon. For this reason the effect of holding periods longer than 2 hours on the survival of bacteria in suspending fluids was investigated in the effort to find a satisfactory fluid for the purpose.

The fluids selected for the first experiment were three that are commonly employed for this and other purposes:

distilled water, physiological saline, and Butterfield's phosphate solution.¹⁰ Butterfield's solution is employed because it is buffered to prevent the solution becoming excessively acid, and this fact suggested additional fluids for use here: distilled water with added di-potassium phosphate, Butterfield's Formula C,¹⁰ and Butterfield's phosphate solution with added sodium hydroxide to make the solution definitely alkaline.

Several persons were asked to dry-drink several glasses each: that is, the glasses were empty, but the subject wet his lips with his tongue and put a glass to his lips as if he were drinking from it. Several glasses were used by each person for each of the suspending fluids studied. The glasses were then allowed to dry and were swabbed with wet swabs. Plates were made immediately after the swabs had been dropped into the fluid, and again after the suspensions had stood at room temperature (about 22° C.) for 5 hours. All technic was the same as that used earlier except that a yeast-extract neopeptone agar containing dextrose was employed instead of nutrient agar. (Some work done after this investigation was under way indicated that the yeast-extract neopeptone agar gave better results than did the nutrient agar. In order that the continuity of the narrative may not be interrupted, the experiments with the medium are placed at the end of this report.) The results obtained with the several suspending fluids are shown in Table 4.

The highest percentage of survival (8.9 per cent) after 5 hours was in Butterfield's phosphate solution and the lowest (1.3 per cent) was in distilled water. The survival (2.3 per cent) in physiological saline was not much better than that in distilled water. The percentages of survival (8.0 per cent and 8.6 per cent respectively) in distilled water with added di-potassium phosphate and Butterfield's phosphate solution with added sodium hydroxide were nearly as good as that in Butterfield's phosphate, but his Formula C showed survival (2.6 per cent) nearly as low as that with physiological saline. None of the fluids, however, sustained the viability of the suspended bacteria satisfactorily for the 5 hour standing period.

The purpose of the next experiment was to determine how rapidly the numbers of bacteria decreased when swabs were held in suspending fluids. The experiment was set up in the same way as that just preceding, except that only physiological saline and Butterfield's phosphate solution were used—the former because it is a common diluting and suspending fluid, and the latter because it had given the best results of the fluids tried in the previous experiment. Twelve glasses were dry-drunk, dried, swabbed, and the swabs suspended in physiological saline; and 12 additional glasses were similarly treated and the swabs suspended in Butterfield's phosphate solution. Plates were made immediately after the swabs were

TABLE 4

*Averages of Counts from Swab Suspensions in Various Fluids Held at Room Temperature—
Counts at 5 Hours Calculated as Percentages of Counts at Beginning*

| Fluid | Original pH | Count at Beginning | Count at 5 Hours | Percentage Survival |
|---|----------------|-----------------------|---------------------|------------------------|
| Distilled Water | 6.0 | 12,000 | 155 | 1.3 |
| Distilled Water + K_2HPO_4 | 8.6 | 3,700 | 317 | 8.6 |
| Physiological Saline | 6.8 | 2,025 | 46 | 2.3 |
| Butterfield's Phosphate Solution | 7.2 | 10,230 | 911 | 8.9 |
| Butterfield's Phosphate Solution + NaOH | 9.9 | 11,400 | 912 | 8.0 |
| Butterfield's Formula C | 7.1 | 10,920 | 289 | 2.6 |

Note: Counts represent number of bacteria per ml. of suspension.

TABLE 5A

Counts from Swab Suspensions in Butterfield's Phosphate Solution Held at Room Temperature for Different Time Intervals—Counts at Beginning Taken as 100 Per cent and Subsequent Counts Calculated as Percentages

| Glass No. | Beginning | % | 30 Min. | % | 60 Min. | % | 90 Min. | % | 120 Min. | % | 150 Min. | % | 180 Min. | % |
|--------------------|-----------|-----|---------|----|---------|------|---------|------|----------|------|----------|------|----------|-----|
| 1 | 12,700 | 100 | 6,800 | 53 | 3,900 | 31 | 3,300 | 26 | 2,600 | 21 | 1,500 | 12 | 1,100 | 9 |
| 2 | 12,600 | 100 | 10,000 | 79 | 6,000 | 48 | 5,900 | 47 | 3,800 | 30 | 2,700 | 21 | 2,300 | 18 |
| 3 | 6,100 | 100 | 3,700 | 61 | 2,400 | 40 | 2,000 | 33 | 1,700 | 28 | 1,000 | 16 | 800 | 13 |
| 4 | 9,200 | 100 | 4,900 | 53 | 2,500 | 27 | 2,200 | 24 | 1,300 | 14 | 1,100 | 12 | 900 | 10 |
| 5 | 15,800 | 100 | 7,300 | 46 | 3,800 | 25 | 2,900 | 18 | 2,000 | 13 | 1,000 | 7 | 800 | 5 |
| 6 | 14,700 | 100 | 7,700 | 53 | 5,200 | 35 | 2,900 | 20 | 2,200 | 15 | 1,800 | 12 | 1,500 | 10 |
| 7 | 25,200 | 100 | 17,000 | 67 | 15,600 | 62 | 9,000 | 36 | 6,200 | 24 | 5,700 | 23 | 3,100 | 12 |
| 8 | 21,500 | 100 | 15,200 | 71 | 12,600 | 59 | 8,700 | 41 | 7,100 | 33 | 4,600 | 22 | 2,300 | 11 |
| 9 | 6,800 | 100 | 5,600 | 82 | 4,600 | 68 | 3,100 | 46 | 2,300 | 34 | 2,000 | 29 | 1,000 | 15 |
| 10 | 40,500 | 100 | 30,200 | 75 | 19,500 | 48 | 8,900 | 22 | 5,100 | 13 | 2,500 | 6 | 1,200 | 3 |
| 11 | 26,100 | 100 | 12,900 | 50 | 12,100 | 46 | 10,000 | 38 | 5,400 | 21 | 2,900 | 11 | 1,500 | 6 |
| 12 | 4,800 | 100 | 2,600 | 54 | 1,500 | 31 | 700 | 15 | 200 | 4 | 200 | 4 | 100 | 2 |
| Average Percentage | | | | 62 | | 43.3 | | 30.5 | | 20.8 | | 14.6 | | 9.5 |

Note: Counts represent number of bacteria per ml. of suspension.

TABLE 5B

Counts from Swab Suspensions in Physiological Saline Held at Room Temperature for Different Time Intervals—Counts at Beginning Taken as 100 Per cent and Subsequent Counts Calculated as Percentages

| Glass No. | Beginning | % | 30 Min. | % | 60 Min. | % | 90 Min. | % | 120 Min. | % | 150 Min. | % | 180 Min. | % |
|--------------------|-----------|-----|---------|------|---------|------|---------|------|----------|------|----------|------|----------|------|
| 13 | 11,100 | 100 | 6,000 | 54 | 4,700 | 42 | 2,200 | 20 | 1,500 | 13 | 800 | 7 | 300 | 3 |
| 14 | 3,500 | 100 | 2,900 | 83 | 2,400 | 69 | 1,900 | 54 | 1,400 | 40 | 700 | 20 | 600 | 17 |
| 15 | 22,200 | 100 | 13,000 | 59 | 7,700 | 35 | 3,600 | 16 | 3,500 | 16 | 1,100 | 5 | 1,100 | 5 |
| 16 | 7,400 | 100 | 5,000 | 68 | 2,600 | 35 | 1,500 | 20 | 1,200 | 16 | 900 | 12 | 900 | 12 |
| 17 | 8,100 | 100 | 4,100 | 51 | 3,400 | 42 | 1,900 | 23 | 1,800 | 22 | 700 | 9 | 300 | 4 |
| 18 | 11,900 | 100 | 8,800 | 74 | 5,300 | 45 | 2,900 | 24 | 1,800 | 15 | 1,500 | 13 | 1,200 | 10 |
| 19 | 16,600 | 100 | 12,300 | 74 | 6,600 | 40 | 5,100 | 31 | 2,000 | 12 | 1,300 | 8 | 900 | 5 |
| 20 | 10,900 | 100 | 6,800 | 62 | 4,400 | 40 | 3,200 | 29 | 1,800 | 16 | 1,300 | 12 | 800 | 7 |
| 21 | 3,200 | 100 | 2,300 | 72 | 1,800 | 56 | 1,300 | 41 | 1,000 | 31 | 700 | 22 | 600 | 19 |
| 22 | 11,400 | 100 | 7,500 | 66 | 5,400 | 47 | 5,000 | 44 | 4,300 | 38 | 3,000 | 26 | 1,400 | 12 |
| 23 | 20,000 | 100 | 16,700 | 84 | 10,900 | 55 | 9,600 | 48 | 7,300 | 37 | 5,700 | 29 | 5,200 | 26 |
| 24 | 6,900 | 100 | 3,700 | 54 | 2,300 | 33 | 900 | 13 | 700 | 10 | 400 | 6 | 300 | 4 |
| Average Percentage | | | | 66.6 | | 44.9 | | 30.2 | | 22.2 | | 14.0 | | 10.3 |

Note: Counts represent number of bacteria per ml. of suspension.

TABLE 6

Counts from Swabs Held in Chilled Suspending Fluids up to Five Hours. Counts at 1, 2, and 5 Hours Calculated as Percentages of Counts at Beginning

| Physiological Saline | | | | | | | | | Butterfield's Phosphate Solution | | | | | | | | |
|----------------------|-----------|-----|--------|-----|---------|----|---------|----|----------------------------------|-----------|-----|--------|-----|---------|----|---------|----|
| No. | Beginning | % | 1 Hour | % | 2 Hours | % | 5 Hours | % | No. | Beginning | % | 1 Hour | % | 2 Hours | % | 5 Hours | % |
| 1 | 8,100 | 100 | 6,400 | 79 | 5,300 | 65 | 1,900 | 23 | 11 | 13,500 | 100 | 12,950 | 96 | 12,750 | 94 | 12,450 | 92 |
| 2 | 12,000 | 100 | 13,000 | 108 | 11,400 | 95 | 6,200 | 51 | 12 | 11,300 | 100 | 11,400 | 101 | 10,400 | 92 | 9,900 | 87 |
| 3 | 10,800 | 100 | 8,900 | 82 | 7,200 | 67 | 4,100 | 41 | 13 | 22,500 | 100 | 18,500 | 82 | 16,700 | 74 | 15,800 | 70 |
| 4 | 10,400 | 100 | 9,200 | 88 | 7,900 | 76 | 4,300 | 41 | 14 | 7,300 | 100 | 7,500 | 100 | 6,300 | 87 | 6,100 | 83 |
| 5 | 11,000 | 100 | 9,600 | 87 | 8,000 | 73 | 4,900 | 44 | 15 | 28,900 | 100 | 23,900 | 83 | 21,900 | 76 | 19,400 | 67 |
| 6 | 7,900 | 100 | 6,900 | 87 | 5,500 | 70 | 3,100 | 39 | 16 | 19,500 | 100 | 16,600 | 85 | 15,300 | 79 | 14,200 | 73 |
| 7 | 6,200 | 100 | 5,300 | 85 | 5,200 | 84 | 1,400 | 23 | 17 | 6,600 | 100 | 6,400 | 97 | 5,400 | 82 | 3,400 | 51 |
| 8 | 3,700 | 100 | 3,000 | 81 | 1,900 | 51 | 500 | 13 | 18 | 25,100 | 100 | 23,300 | 94 | 23,900 | 95 | 19,400 | 77 |
| 9 | 7,600 | 100 | 4,900 | 65 | 4,000 | 53 | 2,900 | 38 | 19 | 20,800 | 100 | 20,500 | 99 | 19,300 | 92 | 14,300 | 69 |
| 10 | 8,400 | 100 | 6,200 | 74 | 4,800 | 57 | 2,700 | 32 | 20 | 22,200 | 100 | 21,700 | 98 | 19,400 | 88 | 13,100 | 59 |
| Average Percentage | | | 83.6 | | 66.1 | | 34.5 | | Average Percentage | | | 93.5 | | 85.9 | | 72.8 | |

Note: Counts represent number of bacteria per ml. of suspension.

put into the respective fluids; then the suspensions were held at room temperature and plates were made at $\frac{1}{2}$ hour intervals up to 3 hours. Results are shown in Tables 5A and 5B. There was a steady decrease in the counts throughout the holding period in both fluids, and even at 30 minutes the decrease was sufficient to make the results of little value in the practical testing of utensils. These findings indicate that holding periods of 2 to 3 hours, permitted in many of the proposed technics, would not give an adequate estimate of the sanitizing procedures in use at eating and drinking establishments.

EFFECT OF CHILLING ON THE VIABILITY OF BACTERIA IN SUSPENSION

In attempting to reduce the loss of bacteria held in suspension, it was decided to try the effect of chilling. Used glasses (dry-drunk) were swabbed as before and swabs from one series of glasses were put into chilled physiological saline and from another series into chilled Butterfield's phosphate solution. The suspending fluids had been chilled by immersing them in a bath of iced water, and the temperature of the bath was maintained at 3° to 5° C. Plates were made immediately after the swabs were dropped into the fluids, and at 1, 2, and 5 hours. Results are shown in Table 6.

The loss of bacteria was much less than in the same fluids held at room temperature (see Tables 5A and 5B). A summary of the comparison shows the following percentages of organisms surviving:

| | Per cent Surviving | | |
|---|--------------------|---------|---------|
| | 1 Hour | 2 Hours | 5 Hours |
| Butterfield's phosphate, room temperature | 44.9 | 22.2 | 10.3 |
| Butterfield's phosphate, chilled | 93.0 | 86.0 | 73.0 |
| Physiological saline, room temperature | 43.3 | 20.8 | 9.5 |
| Physiological saline, chilled | 83.6 | 66.1 | 34.5 |

With the chilled suspensions Butterfield's phosphate solution gave definitely better survival percentages than did physiological saline. With the chilled phosphate solution the survival of organisms was such that suspensions held up to 1 hour should yield counts entirely satisfactory for evaluating the sanitary condition of eating and drinking utensils examined, and survival up to 2 hours would appear to be adequate for a usable interpretation of the counts to be made. This is important because holding periods of from 1 to 2 hours are almost unavoidable in practical field work. Even if suspensions should be held for as long as 5 hours it would still be possible to detect poor sanitization of utensils even though the borderline cases would get by. Results with chilled physiological saline would not be useful after 1 hour of holding.

The results obtained with chilled Butterfield's phosphate solution indicate that it can be recommended as a suspending fluid for the sanitary examination of eating and drinking utensils.

PRACTICAL APPLICATION

Up to this point all of the experimental work had been done in the laboratory, so it was decided to try the method under practical conditions. Several establishments serving food were visited as a sanitary inspector would visit them. Included were several boarding houses, a restaurant, and a bar. Drinking glasses supposed to be clean were swabbed with wet swabs, and physiological saline and Butterfield's phosphate solution were employed for suspending fluids. Bottles of these fluids were placed in iced water containers before they were taken from the laboratory and were kept chilled until the final plates were made. Swabs were dropped into the suspending fluid immediately after the swabbing was done; and as soon as possible,

TABLE 7

*Practical Application of Procedure in Establishments Serving Food and Drink to the Public—
Counts from Swab Suspensions in Saline and in Butterfield's Phosphate Solution Held
for 2 Hours; Counts at 2 Hours Calculated as Percentages of Those at Beginning*

| Saline | | | | Butterfield's Phosphate Solution | | | |
|--------------------|-----------|---------|----|----------------------------------|-----------|---------|-----|
| Glass No. | Beginning | 2 Hours | % | Glass No. | Beginning | 2 Hours | % |
| 1 | 560 | 390 | 70 | 13 | 450 | 420 | 93 |
| 2 | 330 | 220 | 67 | 14 | 330 | 260 | 85 |
| 3 | 1,470 | 1,260 | 86 | 15 | 1,660 | 1,540 | 93 |
| 4 | 1,120 | 740 | 66 | 16 | 1,090 | 980 | 90 |
| 5 | 1,320 | 980 | 74 | 17 | 1,300 | 1,210 | 93 |
| 6 | 1,430 | 1,110 | 78 | 18 | 1,500 | 1,400 | 93 |
| 7 | 440 | 380 | 86 | 19 | 330 | 260 | 79 |
| 8 | 3,770 | 2,860 | 76 | 20 | 3,040 | 3,060 | 101 |
| 9 | 2,330 | 1,440 | 62 | 21 | 2,970 | 2,960 | 100 |
| 10 | 1,190 | 880 | 74 | 22 | 1,210 | 1,070 | 88 |
| 11 | 1,270 | 910 | 72 | 23 | 1,200 | 1,100 | 92 |
| 12 | 1,170 | 1,030 | 88 | 24 | 1,230 | 1,120 | 91 |
| Average Percentage | | | 75 | | | | 92 |

Note: Counts represent number of bacteria per ml. of suspension. Chilled suspending fluids were used.

always within 1 hour, the suspensions were returned to the laboratory where plates were made immediately and again after 2 hours.

Representative results are shown in Table 7. Counts at 2 hours are calculated as percentages of the counts made from the first platings. Again, results from Butterfield's phosphate solution were better than those from physiological saline. The average survival after 2 hours was 92 per cent for the phosphate solution, and only 1 of the 12 samples showed less than 85 per cent. With the physiological saline only 3 of 12 samples showed over 80 per cent survival, and 88 per cent was the maximum. The average was 75 per cent.

On the basis of these results, chilled Butterfield's phosphate solution was definitely superior to chilled physiological saline as a suspending and holding fluid, and the results again indicate that the chilled phosphate solution can be recommended as satisfactory for the practical testing of the effectiveness of the sanitization of eating and drinking utensils.

MEDIA

In the first few experiments of this investigation nutrient agar was em-

ployed for plating. This medium, however, probably does not adequately promote the growth of some significant types of oral bacteria, particularly streptococci. It is a matter of common knowledge that streptococci, and particularly non-pyogenic types such as *Streptococcus salivarius*, are common mouth flora. Dick and Hucker¹⁴ proposed that the detection of oral streptococci be employed as a presumptive test for evaluating the sanitization of eating and drinking utensils. It appeared to be desirable, in the present study, to devise a medium that would be likely to produce good growth of streptococci and any other oral organisms that do not grow well on ordinary media.

In considering materials to be used in the new medium, it was decided to incorporate dextrose, neopeptone, and yeast extract. Dextrose is a growth stimulant for most bacteria. Neopeptone is suitable for the growth of bacteria that are fastidious in their feeding habits; it is recommended especially for cultivating pneumococci and streptococci. Lancefield¹⁵ used neopeptone in her work on the classification of streptococci. Bacto-yeast extract has been used¹⁶ to promote

growth of bacteria that are difficult to cultivate, and Hutner¹⁷ used it in his basic medium in making nutrition studies with streptococci. The composition of the medium used here was as follows:

| | |
|----------------------------------|-------------|
| Neopeptone, Difco | 10.0 gm. |
| Bacto-yeast extract, Difco | 5.0 " |
| Dextrose | 0.5 " |
| Sodium chloride | 5.0 " |
| Bacto-agar, Difco | 15.0 " |
| Distilled water | 1,000.0 ml. |

The reaction was adjusted to pH 7.5 and the medium was sterilized at 15 pounds steam pressure for 15 minutes. This medium, referred to earlier as yeast-extract neopeptone agar, is somewhat similar to that used by Hucker.⁸

A number of stock laboratory cultures of streptococci, both hemolytic and non-hemolytic, were streaked on plates of both media. Colonies were larger and growth in general was better on the yeast-extract neopeptone agar than on nutrient agar. Then a series of glasses were "dry-drunk" by several persons and swabbed. Suspensions from the swabs were plated on both media. Representative results are shown in Table 8. Definitely larger counts were obtained on the yeast-extract neopeptone medium, and colonies were larger in general than on the

nutrient agar. Recommendation of the yeast-extract neopeptone medium seems to be justified for use in evaluating the sanitization of eating and drinking utensils.

SUMMARY

Two kinds of swabs were used, designated as damp and wet swabs. The former were moistened in fluid and then sterilized in a test tube without additional fluid. The wet swabs were first sterilized dry in a test tube, then just before they were used they were wet thoroughly in sterile fluid and the excess fluid squeezed out against the side of the tube. The wet swabs proved to be definitely more efficient than the damp swabs in recovering bacteria from the rims of drinking glasses. Distilled water and physiological saline were equally satisfactory for wetting the swabs.

Several suspending fluids examined were: distilled water, physiological saline, Butterfield's phosphate solution, Butterfield's Formula C, distilled water with added K₂HPO₄, and Butterfield's phosphate solution with the pH value raised by addition of NaOH. The survival of bacteria in these fluids up to 5 hours at room temperature was investigated. Distilled water was least satisfactory, and Butterfield's phosphate solution gave the highest percentage of survival. None was sufficiently satisfactory for practical use. Saline and Butterfield's phosphate solution were again investigated and counts of suspensions were made at 30 minute intervals. Neither fluid sustained bacterial viability satisfactorily for even 30 minutes.

Bacterial suspensions were made in Butterfield's phosphate solution and in physiological saline, both of which were chilled by immersing the containers in an iced water bath. Butterfield's phosphate gave excellent survival at 1 hour

TABLE 8

Comparison of Counts from Swab Suspensions on Two Media—Counts on Nutrient Agar Are Calculated as Percentages of Counts on Neopeptone-Yeast-Extract Agar

| Glass No. | Neopeptone-Yeast-Extract Agar | Nutrient Agar | % |
|-----------|-------------------------------|---------------|----|
| 1 | 1,780 | 1,070 | 60 |
| 2 | 890 | 590 | 66 |
| 3 | 6,300 | 3,100 | 49 |
| 4 | 4,200 | 2,700 | 64 |
| 5 | 4,200 | 3,600 | 86 |
| 6 | 6,200 | 4,400 | 71 |
| 7 | 360 | 270 | 75 |
| 8 | 720 | 460 | 64 |
| 9 | 390 | 210 | 54 |
| 10 | 7,100 | 3,000 | 42 |

Note: Counts represent number of bacteria per ml. of suspension.

and satisfactory survival at 2 hours. Even at 5 hours the survival was sufficient to permit detection of definitely poor sanitization procedures. Practical field tests verified the experimental results.

A medium containing neopeptone, yeast extract, and dextrose gave much better growth of oral streptococci than did nutrient agar. It also gave higher counts and larger colonies than were obtained on nutrient agar.

As a result of this investigation the following recommendations are made:

1. Swabs should be made on wood applicator sticks and sterilized dry. Just before a swab is used it should be wet thoroughly in a sterile fluid and excess fluid squeezed from the cotton by pressing the swab against the inside wall of the container. The kind of fluid used to wet the swab makes little difference, but it would be well to use the same fluid that is used for suspensions.

2. Wet swabs should be rubbed thoroughly over the surfaces to be examined; then the sticks should be broken just above the cotton with flamed forceps and the swabs dropped into containers of sterile suspending fluid. The containers, preferably bottles, should be shaken until the cotton of the swabs fluffs out. Plates may be made in the usual way.

3. Butterfield's phosphate solution is recommended for use as a suspending fluid. Sterile containers—tubes or bottles—of the solution should be immersed in iced water and chilled before they are used, and kept chilled until plates are made. It is desirable that plates be made within 1 hour after swabbings have been done, but usable results can be obtained if it is necessary to hold the suspensions up to 2 hours. A longer holding period should be avoided if it is at all possible.

4. A medium should be employed that will support the growth of certain fastidious bacteria, and especially oral streptococci. Such

a medium, consisting of 10 gm. neopeptone (Difco), 5 gm. Bacto-yeast extract (Difco), 0.5 gm. dextrose, 5 gm. sodium chloride, 15 gm. Bacto-agar (Difco), and 1,000 ml. water, pH 7.5, gave good results.

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Venereal Disease Epidemiology

Third Service Command

An Analysis of 4,641 Contact Reports

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IN the summer of 1940, the Army, Navy, Federal Security Agency, and state health departments entered into the well known Eight Point Agreement on measures to be developed for the control of the venereal diseases. Out of this joint agreement there has developed a great network of activities which should produce the lowest venereal disease rate in the history of the Armed Forces and should entangle in its meshes enough of the syphilis and gonorrhea in this country to curb the further spread of this blight on our national health.

The Army and Navy have undertaken to furnish to the civil health authorities information which will lead to the discovery of disease in the civilian communities. At the beginning of the program the forms used by the

various Army stations for reporting contacts of venereal disease to the health authorities varied considerably in detail but the nature of the information which they conveyed was basically the same, that is, the name and address of the alleged contact, when obtainable, and her description. There has evolved from that heterogeneous collection the standard Army form, MD-140 "Report of a Contact of Venereal Disease," shown in Figure 1. The reverse side of the form is designed for reporting the result of the investigation.

The system instituted in the Third Service Command provides for the reports of the results of health departments' investigations to be routed back to the camp of origin through the Service Command Headquarters. Here, with the assistance of the Public Health

TABLE 1
*Completeness of Information—Army Contacts, Third Service Command
March through December, 1942*

| Color | Sufficient Information for Possible Location of the Contact | | Sufficient Information for Referral for Possible Location of Focus of Infection | | Insufficient Information for Referral for Any Purpose | | Total Contacts Reported | |
|---------|---|----------|--|----------|--|----------|----------------------------|----------|
| | No. | Per cent | No. | Per cent | No. | Per cent | No. | Per cent |
| White | 462 | 24.3 | 557 | 29.4 | 878 | 46.3 | 1,897 | 100.0 |
| Colored | 871 | 33.0 | 672 | 25.5 | 1,096 | 41.5 | 2,639 | 100.0 |
| Other | 25 | 23.8 | 32 | 30.5 | 48 | 45.7 | 105 | 100.0 |
| Total | 1,358 | 29.3 | 1,261 | 27.2 | 2,022 | 43.5 | 4,641 | 100.0 |

FIGURE 1

Form 140
MEDICAL DEPARTMENT, U.S.A.
(Authorized Oct. 22, 1942)

REPORT OF A CONTACT OF VENEREAL DISEASE

STATION _____

To Health Officer _____ Date _____

A soldier _____ (Serial number) _____ (Organization) _____ (Race) _____ (Age) _____ infected
with _____ (Name of disease) _____, exposed on _____ (Date) _____ at _____ (Hour) _____ and whose
symptoms began _____ (Date) _____ and diagnosis made on _____ (Date) _____
gave the following information.

CONTACT HISTORY

ALLEGED CONTACT: Name (and nickname) _____

Address: _____
(Number, street, and city)

Race _____ Age _____ Height _____ Weight _____ Color eyes _____ Color hair _____

Other descriptive features _____

Occupation _____ Place of employment _____

TYPE OF CONTACT: ☐ Wife. ☐ Friend. ☐ Pickup. ☐ Streetwalker. ☐ Brothel. ☐ Call-girl.

PLACE OF EXPOSURE: ☐ Home. ☐ Hotel. ☐ Cab. ☐ Auto or trailer. ☐ Brothel. ☐ Other.

Name and address of place of exposure _____

CONDITION OF PATIENT AT TIME OF EXPOSURE: ☐ Intoxicated. ☐ Drinking moderately. ☐ Sober.

PROPHYLAXIS: ☐ None. ☐ Condom. ☐ Self-administered chemical, type _____

Official station _____ (Address) _____ Date _____ Hour _____

PROCUREMENT HISTORY

PROCURER: ☐ Own effort. ☐ Pimp. ☐ Cabman. ☐ Waiter. ☐ Bellhop. ☐ Newsboy. ☐ Other.

Description of procurer _____

PLACE OF PROCUREMENT OR ENCOUNTER: ☐ Bus or R. R. depot. ☐ Hotel. ☐ Cab. ☐ Street. ☐ Tavern.

☐ Dance hall. ☐ Poolroom. ☐ Private property. ☐ Other _____

Name and address of place of procurement _____

AMOUNT PAID _____ To whom: ☐ Contact. ☐ Procurer. ☐ Other (specify) _____

REMARKS: _____

Please report the results of your investigation on the reverse of this form.

(Signed) _____

(For instructions and distribution see final sheet in this pad)

(16-5125-1)

Service Central Tabulating Unit, a statistical record is kept and an analysis of 4,641 contact reports covering the period March 1 to December 31, 1942, has been made in an effort to ascertain the relative importance of the component parts of the problem and to measure the effectiveness of the Army-Health Department Control Program.

Figure 2 shows that the reported con-

tacts were distributed widely throughout the United States, although the Third Service Command comprises only the States of Pennsylvania, Maryland, and Virginia.

Table 1 represents an evaluation of the information furnished to the health departments. According to completeness, the information fell into one of three categories: (1) sufficient for the

REVERSE OF FIGURE 1

REPORT OF INVESTIGATION OF VENEREAL DISEASE CONTACT

To CHIEF, MEDICAL BRANCHHEADQUARTERS THIRD SERVICE COMMAND, BALTIMORE, MARYLAND.

The results of our investigation are as follows:

Infected with _____
(Name and stage of disease)Under treatment: ☐ Prior to investigation. ☐ As result of investigation.☐ Not infected.☐ Not examined.Information concerning the method and place of meeting and the place of exposure ^{(has} _{has not} been
called to the attention of law enforcement agencies.

(Signed) _____

★ U. S. GOVERNMENT PRINTING OFFICE 1942 16-51725-1

location of the alleged contact; (2) sufficient to provide a possible lead for the location of the alleged contact or to point out places which appear to facilitate the transmission of disease; and (3) insufficient for any practical purpose. Each contact report was appraised on its face value by one of the authors. It is recognized, however, that this evaluation is not absolute because of the element of uncertainty or deliberate misrepresentation on the part of the informant. Nevertheless, the results of the investigations bear out the relative validity of the appraisal.

Table 2 shows the classification of the alleged contact. It indicates that the "prostitute class" (fee paid), namely

the streetwalker, brothel inmate, and call-girl accounted for only 21.1 per cent of the infections, while "friend" or "casual pickup" (no fee) accounted for 72.1 per cent of the infections. The wife was named as the probable source or as an exposed contact in 6.6 per cent of the cases. Evidence from other sources seems to substantiate these figures. It was found that among the sources of infection of soldiers in the British Army 80 per cent were the "casual" or "amateur" type.¹ It has been stated that 85 per cent of the contacts of Australian soldiers are non-professional.² Venereal disease contact reports from nine continental naval stations during an 8 month period in 1942

TABLE 2

*Type of Contact—Army Contacts, Third Service Command**March through December, 1942**By Number and Per cent*

| Color | Wife | Friend | Pickup No Fee | Street Walker | Brothel | Call- girl | Other | Total Known | Total Contacts |
|------------------|------------|-------------|------------------|------------------|------------|---------------|-----------|----------------|-------------------|
| White | 109 6.3 | 248 14.4 | 1,107 64.1 | 133 7.7 | 106 6.1 | 21 1.2 | 3 0.2 | 1,727 100.0 | 1,897 |
| Colored | 161 6.8 | 528 22.3 | 1,063 44.9 | 454 19.2 | 149 6.3 | 6 0.2 | 7 0.3 | 2,368 100.0 | 2,639 |
| Other or Unknown | 6 6.2 | 8 8.2 | 67 69.1 | 9 9.3 | 7 7.2 | .. .. | .. .. | 97 100.0 | 105 |
| Total | 276 6.6 | 784 18.7 | 2,237 53.4 | 596 14.2 | 262 6.3 | 27 0.6 | 10 0.2 | 4,192 100.0 | 4,641 |

Figure 2. DISTRIBUTION OF 4641 VENEREAL DISEASE CONTACTS REPORTED BY ARMY CAMPS IN THE THIRD SERVICE COMMAND.....MARCH THROUGH DECEMBER 1942

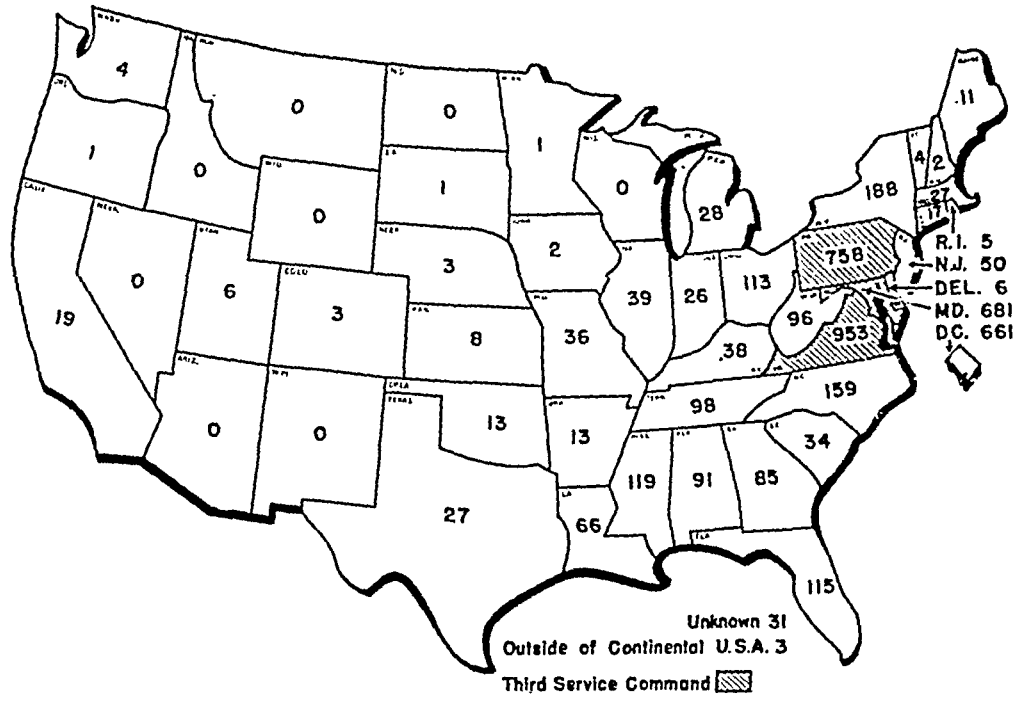


TABLE 3

Place of Procurement or Encounter—Army Contacts, Third Service Command
March through December, 1942
By Number and Per cent

| Type of Contact and Color | Bus or R.R. | Depot | Hotel | Cab | Street | Tavern * | Dance Hall | Home or Apt. | Other | Total Known | Total Contacts |
|---------------------------|-------------|-------|-------|-------|--------|----------|------------|--------------|-------|-------------|----------------|
| Clandestine | | | | | | | | | | | |
| White | 45 | 30 | 6 | 405 | 504 | 47 | 79 | 141 | 1,257 | 1,355 | |
| | 3.6 | 2.4 | 0.5 | 32.2 | 40.1 | 3.7 | 6.3 | 11.2 | 100.0 | | |
| Colored | 17 | 19 | 2 | 405 | 465 | 48 | 256 | 197 | 1,409 | 1,591 | |
| | 1.2 | 1.4 | 0.1 | 28.7 | 33.0 | 3.4 | 18.2 | 14.0 | 100.0 | | |
| Other—Unknown | 2 | .. | .. | 19 | 28 | .. | .. | 10 | 59 | 75 | |
| | 3.4 | .. | .. | 32.2 | 47.5 | .. | .. | 16.9 | 100.0 | | |
| Total | 64 | 49 | 8 | 829 | 997 | 95 | 335 | 348 | 2,725 | 3,021 | |
| | 2.3 | 1.8 | 0.3 | 30.4 | 36.6 | 3.5 | 12.3 | 12.8 | 100.0 | | |
| Prostitute | | | | | | | | | | | |
| White | 3 | 38 | 3 | 58 | 56 | 2 | 2 | 83 | 245 | 260 | |
| | 1.2 | 15.5 | 1.2 | 23.7 | 22.9 | 0.8 | 0.8 | 33.9 | 100.0 | | |
| Colored | 7 | 10 | .. | 208 | 212 | 16 | 27 | 109 | 589 | 609 | |
| | 1.2 | 1.7 | .. | 35.3 | 36.0 | 2.7 | 4.6 | 18.5 | 100.0 | | |
| Other—Unknown | .. | .. | .. | 4 | 6 | .. | .. | 6 | 16 | 16 | |
| | .. | .. | .. | 25.0 | 37.5 | .. | .. | 37.5 | 100.0 | | |
| Total | 10 | 48 | 3 | 270 | 274 | 18 | 29 | 198 | 850 | 885 | |
| | 1.2 | 5.6 | 0.4 | 31.8 | 32.2 | 2.1 | 3.4 | 23.3 | 100.0 | | |
| Total Non-familial | 74 | 97 | 11 | 1,099 | 1,271 | 113 | 364 | 546 | 3,575 | 3,906 | |
| | 2.1 | 2.7 | 0.3 | 30.7 | 35.6 | 3.2 | 10.2 | 15.3 | 100.0 | | |

*Includes cafe, restaurant, night club

TABLE 4

*Place of Exposure—Army Contacts, Third Service Command
March through December, 1942
By Number and Per cent*

| <i>Type of Contact and Color</i> | <i>Home or Apt.</i> | <i>Hotel or Rooming House</i> | <i>Cab</i> | <i>Auto or Trailer</i> | <i>Brothel</i> | <i>Out-doors</i> | <i>Tourist Cabin</i> | <i>Other</i> | <i>Total Known</i> | <i>Total Contacts</i> |
|----------------------------------|---------------------|-------------------------------|------------|------------------------|----------------|------------------|----------------------|--------------|--------------------|-----------------------|
| Clandestine | | | | | | | | | | |
| White | 252 19.4 | 302 23.3 | 23 1.8 | 411 31.7 | .. .. | 177 13.7 | 82 6.3 | 49 3.8 | 1,296 100.0 | 1,355 |
| Colored | 686 46.4 | 299 20.2 | 8 0.5 | 293 19.8 | .. .. | 108 7.3 | 9 0.6 | 77 5.2 | 1,480 100.0 | 1,591 |
| Other-Unknown | 11 16.9 | 13 20.0 | 1 1.5 | 15 23.1 | .. .. | 17 26.2 | 3 4.6 | 5 7.7 | 65 100.0 | 75 |
| Total | 949 33.4 | 614 21.6 | 32 1.1 | 719 25.3 | .. .. | 302 10.7 | 94 3.3 | 131 4.6 | 2,841 100.0 | 3,021 |
| Prostitute | | | | | | | | | | |
| White | 16 6.2 | 77 30.0 | 13 5.1 | 16 6.2 | 105 40.9 | 14 5.4 | 8 3.1 | 8 3.1 | 257 100.0 | 260 |
| Colored | 169 29.1 | 131 22.5 | 2 0.3 | 37 6.4 | 185 31.8 | 24 4.1 | 2 0.3 | 32 5.5 | 582 100.0 | 609 |
| Other-Unknown | 1 6.3 | 5 31.2 | .. .. | 1 6.3 | 7 43.7 | 2 12.5 | .. .. | .. .. | 16 100.0 | 16 |
| Total | 186 21.8 | 213 24.9 | 15 1.7 | 54 6.3 | 297 34.7 | 40 4.7 | 10 1.2 | 40 4.7 | 855 100.0 | 885 |
| Total Non-familial | 1,135 30.7 | 827 22.4 | 47 1.3 | 773 20.9 | 297 8.0 | 342 9.3 | 104 2.8 | 171 4.6 | 3,696 100.0 | 3,906 |

indicate that 77 per cent of the infections were due to "girl friends" or "casual pickups."³ In figures released by the United States Air Force, brothels were reported as being responsible for 5 per cent of the infections with

"casual pickups" and "friends" accounting for 80 per cent.⁴

Table 3 shows the place of procurement or encounter. The tavern class, which includes restaurant, cafe, and night-club, leads with 35.6 per cent;

TABLE 5

*Results of Investigation by Completeness of Information
Army Contacts, Third Service Command
March through October, 1942 *
By Number and Per cent*

| <i>Completeness of Information</i> | <i>Not Infected</i> | <i>Under Trt. as Result of Invest.</i> | <i>Under Trt. Prior to Invest.</i> | <i>Infected—Not under Treatment</i> | <i>Total Located</i> | <i>Not Examined</i> | <i>Insuff. Info. for Invest.</i> | <i>No Dis. Position Returned</i> | <i>Total</i> |
|--|---------------------|--|------------------------------------|-------------------------------------|----------------------|---------------------|----------------------------------|----------------------------------|----------------|
| Sufficient for Location of Contact | 258 25.7 | 146 14.5 | 64 6.4 | 7 0.7 | 475 47.3 | 260 25.9 | 22 2.2 | 247 24.6 | 1,004 100.0 |
| Sufficient for Location of Foci of Infection | 90 10.1 | 61 6.8 | 21 2.3 | 5 0.6 | 177 19.8 | 332 37.2 | 138 15.4 | 247 27.6 | 894 100.0 |
| Insufficient for any Purpose | 10 0.8 | 14 1.1 | 7 0.5 | 1 0.1 | 32 2.5 | 274 21.5 | 279 21.9 | 690 54.1 | 1,275 100.0 |
| Total | 358 11.3 | 221 7.0 | 92 2.9 | 13 0.4 | 684 21.6 | 866 27.3 | 439 13.8 | 1,184 37.3 | 3,173 100.0 |

* The results of investigation are presented only on 3,173 contacts reported through October, 1942, as a minimum of 2 months is allowed the health department to investigate the case.

street encounters were next with 30.7 per cent; and the remaining 33.7 per cent widely distributed as shown.

Table 4 shows the place of exposure and indicates that the home, apartment, hotel, or rooming house was named in 53.1 per cent of the cases. The automobile was next most frequently named with 20.9 per cent. Taxicabs and tourist cabins were mentioned less frequently than had been expected, namely 1.3 per cent for the former and 2.8 per cent for the latter.

Table 5 shows the results of the investigations by the health departments. Only those cases which were reported for investigation during the period March 1 to October 31, 1942, are included in this table, since the health departments were allowed at least 60 days in which to report the disposition before the cases were closed for this compilation. Of the 3,173 contacts reported during that period, reports of dispositions by the health departments were returned in 1,989 cases or 62.7 per cent. Located contacts amounted to 684, or 21.6 per cent, of which 326, or 10.3 per cent, of the total were found infected. It was found that 28 per cent of these were already under treatment by the time the investigation was made. Therefore, out of 3,173 reported contacts, only 234 previously unknown cases of disease were immediately uncovered. Eight hundred and sixty-six, or 27.3 per cent, could not be located upon investigation and no attempt was made to locate 439 contacts because of the lack of useful information.

COMMENTS

The Army has undertaken the task of securing contact information from all venereal disease patients in order that epidemiologic investigations may be made by the Civil Health Authorities. The Army is obliged, therefore, to determine whether or not the time and effort spent in initiating the process is

justified by the results obtained. Are the health departments "following up" the contacts and are the infected contacts appropriately treated so that they will not infect more soldiers? Is the program contributing enough to the war effort to justify its continuance? These questions can be answered authentically only through such periodic analyses as the one here presented.

It appears from this analysis that at the present time 80 per cent of the problem depends upon the control of clandestine sources of disease. It is also apparent that the epidemiologic methods demonstrated in this study have definite limitations. It is our opinion, however, that the epidemiologic program, as it is now set up, could function with much greater effectiveness if the Army stations would exercise more care and diligence in obtaining contact information, and if the health departments would make full use of the information furnished. Although no attempt has been made in this paper to show the comparative effectiveness of the venereal disease control work in the several Army camps or by the various health departments, the authors have had the opportunity to make such comparisons from the basic data.

The Army personnel who interview the patients should be trained for this work. Those stations which have consistently furnished superior information have Venereal Disease Control Officers who appreciate the value of careful questioning. Some stations have made profitable use of trained health department interviewers. It has been shown to be important to interview the new patient before he has had an opportunity to be coached by his ward mates. The station which has consistently furnished the best contact information has a trained enlisted man who interviews the patient immediately upon admission, before he is taken to the ward.

Curiously enough, this same station has had the lowest average venereal disease rate of all stations in the Third Service Command.

A study of the reports from health departments indicated that the "follow-up" activities of some lack vigor and purposefulness. In many instances the investigations were delayed several weeks after the contact information had been received by the health department. The notation was often made that the alleged contact "refused to be examined," or, "has not reported to the clinic as directed." Many "could not be located," although the place of residence or place of employment was known. There was considerable evidence that some health officers failed to exercise the authority vested in them for the control of communicable diseases. On the other hand, it is expected that among the 1,184 unreported cases there are many upon which the health departments will report later. It also seems reasonable to assume that among the 684 contacts who were located by the health departments there were individuals who were responsible for more than one soldier's infection, but who may not have been recognized as the same person described on different contact reports. When the contact could be definitely identified, however, on more than one report and was located by the health department, it is possible that she may have been included in one of the "located" columns more than once. These possibilities should be borne in mind when critically evaluating the effectiveness of the program.

The fact that a diagnosis of disease was made in only about 50 per cent of the located contacts may be partially explained on the basis of the acknowledged deficiency of the laboratory diagnosis of gonorrhea, particularly in the female; also on the basis that many suspects may have recovered from their

infection by the time the health department examination was made.

If health departments could develop as thorough case finding programs in their own clinics as the Army has done, and if private physicians would comply with the rules and regulations governing the reporting of venereal diseases, which are in effect in most states, and would take an active interest in venereal disease epidemiology, progress in bringing these diseases under control would be greatly accelerated.

It is evident also from this analysis that the interstate spread of the venereal diseases constitutes a serious problem. In spite of this fact the Interstate Quarantine Regulations governing the travel of venereally infected persons are seldom applied. The time may be opportune for revising these regulations by expanding their scope to cover not only the interstate traveler but also the individual who has exposed the traveler to disease. It would be impractical to attempt to enforce the existing regulations in the case of members of the Armed Forces.

Commercialized prostitution seems to be reasonably well repressed. The scattered remnants of the racket are permitted to survive only because of the tolerant, frequently patronizing, attitude on the part of public officials in certain communities. Any community can reduce commercialized prostitution to an insignificant minimum if it has a mind to do so.

SUMMARY

1. During a 10 month period, 4,641 venereal disease contacts (1,897 white, 2,639 colored, and 105 other) were reported to health departments. The dispositions of 62.7 per cent of the cases were reported back by the health departments.

2. Although reported by soldiers in the Third Service Command, the exposures took place with girls in all but 9 of the 48 states.

3. Thirty per cent of the contact forms contained information considered adequate for location of the contact; an additional 27

per cent contained sufficient information for possible location of the contact or of places in which venereal disease has been acquired; and 43 per cent contained insufficient information for any practical purpose. The colored soldiers gave slightly better information than the whites.

4. The pickup to whom no fee was paid was the leading source of infection (64 per cent white and 45 per cent colored). The streetwalker (fee) was responsible for about 14 per cent of the infections, and brothels 6 per cent. The paid prostitute constituted only one-fifth of the sexual contacts.

5. The tavern (cafe, restaurant, night-club) was the leading place of encounter for both clandestine contacts and prostitutes with "street" next in order.

6. The automobile was the most common place of exposure for white clandestine contacts and the home or apartment for colored. Hotels and rooming houses accounted for the next highest proportion for both white and colored.

7. The brothel was the most common place of exposure for both white and colored prostitutes but proportionately higher for

white than colored. The hotel or rooming house ranked second for white prostitutes whereas the home or apartment ranked second among colored prostitutes.

8. Of the 3,173 contacts reported to health authorities by camps and stations in the Third Service Command, March through October, 1942, approximately 22 per cent were located by the close of the compilation period, December 31, 1942. Approximately 50 per cent of those located showed no conclusive evidence of infection at the time of examination. Of those found infected, 28 per cent were under treatment prior to the investigation.

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The Course of the Serologic Tests during Therapeutic Malaria in Patients with Syphilis*

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IN connection with investigations on the rôle of malaria in the treatment of syphilis, changes were noted in the quantitative serologic tests during the course of the induced infections. These findings form the basis for this report.

We know of no previous systematic study of the effect of malarial infection upon the quantitative determination of reagin in the serum of patients with syphilis. On the other hand, the development of a false positive serologic test for syphilis during the course of malaria in non-luetics seems to be well established by the recent investigations of Kitchen, Webb, and Kupper,¹ and of Burney, Mays, and Iskrant.² The earlier literature on this subject has been reviewed by Hazen and his collaborators.³

METHODS AND MATERIAL

All individuals included in this report were studied at Sing Sing Prison Hospital with the exception of 10 patients who were observed in collabora-

tion with Dr. Evan W. Thomas at Bellevue Hospital. Patients with latent or central nervous system syphilis who were to receive malaria therapy were hospitalized on the day of inoculation and were permitted to have 6 to 8 febrile paroxysms. The infection was terminated with either quinine sulfate or atabrine. Intensive arsenotherapy with mapharsen was given either by intravenous drip⁴ before or after the anti-malarial agents or by the multiple syringe method⁵ which was given concurrently. With the former method the patient received the infusions on 3 consecutive days totalling 600 to 720 mg. of mapharsen while with the latter technic 10 daily injections of 60 mg. of mapharsen were given.

Thirty-three patients with latent or central nervous system syphilis were inoculated with *Plasmodium malariae* and 11 patients were inoculated with *Plasmodium vivax*. The strains employed have been in constant use for several years and have been observed to produce characteristic clinical infections in susceptible individuals.

To control our observations upon the changes in serologic tests in syphilitic individuals during the course of thera-

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peutic malaria, we are reporting serologic studies made on 50 patients with latent and central nervous system syphilis who were treated with fever induced by intravenous typhoid vaccine combined with intensive mapharsen drip therapy. In addition, we are recording our observations on a group of 25 patients with latent syphilis who received intensive mapharsen drip therapy alone. These 2 groups have been previously described.⁴

An analysis of the patients in these various therapeutic groups showed no significant differences regarding age or color, duration of the disease, previous therapy, and initial serologic titer. In general, the previous treatment was irregular and usually inadequate. The duration of the disease, when known, was evenly distributed between 3 and 20 years in all groups. The age groups would be too small to warrant a breakdown in that regard.

Serologic studies were done 3 times weekly during the course of induced malaria and daily during typhoid vaccine fever and arsenotherapy. All serologic studies were performed in the Division of Laboratories and Research, New York State Department of Health, Albany, N. Y. The complement-fixation test, which was done on all specimens, was the quantitative procedure described by Wadsworth, Maltaner, and Maltaner.⁶ In addition, quantitative flocculation titers were determined simultaneously on many of the specimens obtained from the malaria treated patients, using both New York State⁷ and Kahn⁸ procedures. As the results obtained with these two flocculation tests were essentially identical, only the Kahn titers will be reported as this latter test has had more universal usage.

To control the effects of malarial infection upon serologic reactions other than those associated with syphilis, 6 patients were vaccinated with *Eber-*

thella typhosa antigen a few weeks prior to inoculation with *P. malariae*. Quantitative *E. typhosa* agglutination titers were then determined throughout the course of the malarial infection. The course of the antibodies was controlled by following the titers of 7 vaccinated patients who did not receive malaria therapy.

As this report is concerned only with the serologic changes referable to the actual malarial infection and not to the serologic response noted months later, the results presented include only those occurring during the febrile period and the subsequent week.

RESULTS

Tables 1, 2, and 3 refer to patients receiving therapeutic malaria and record the day following inoculation upon which the first febrile paroxysm occurred, the initial quantitative complement-fixation and Kahn flocculation titers just prior to inoculation, the first day upon which there was noted a tendency of the titer to rise or fall, and the maximal extent of that change. In the case of the complement-fixation test the maximal change is also recorded in terms of the percentage of the initial titer. The Kahn titers are expressed in units.⁸ In all but two instances the trends were first noted during the course of the malarial infection but the progression frequently extended into the week following the last paroxysm. The highest or lowest levels reported, therefore may have occurred while the patient was receiving atabrine, quinine sulfate, or intensive arsenotherapy. The negative effect of the latter type of therapy upon the serologic titer is indicated by the control studies.

Of the 23 patients with central nervous system syphilis who were treated with *P. malariae* infection (Table 1), 22 exhibited a progressive fall in complement-fixation titer during the course of the febrile paroxysms. With the one

TABLE 1

The Changes in the Quantitative Serologic Titer in 23 Patients with Central Nervous System Syphilis During the Course of Induced Plasmodium Malariae Infection

| Case Number | First Paroxysm * | New York State Complement-fixation Titer | | | | Kahn Flocculation Units | | |
|----------------|---------------------|--|----------------------|------------------------------------|----|-------------------------|--------------------------|-------------------|
| | | Initial Titer | Trends Observed * | Maximum Changes | | Initial Titer | Trends Observed * | Levels Reached |
| | | | | Per cent of Titer Initial Titer | | | | |
| 1 | 14 | 25 | Fall -- 20 | 8.9 | 36 | 3 | Rise -- 16 Fall -- 23 | 240 2 |
| 2 | 9 | 3.6 | Fall -- 19 | 0 | 0 | | | |
| 3 | 11 | 36 | Fall -- 26 | 8.2 | 23 | | | |
| 4 | 5 | 41 | Fall -- 9 | 10 | 24 | 20 | Rise -- 11 Fall -- 18 | 160 3 |
| 5 | 18 | 18 | None | .. | .. | 20 | Rise -- 27 Fall -- 37 | 200 40 |
| 6 | 9 | 41 | Fall -- 20 | 15 | 36 | 80 | Fall -- 24 | 4 |
| 7 | 25 | 12 | Fall -- 20 | 1.7 | 14 | | | |
| 8 | 27 | 15 | Fall -- 34 | 2.6 | 17 | | | |
| 9 | 6 | 62 | Fall -- 16 | 24 | 38 | | | |
| 10 | 9 | 28 | Fall -- 19 | 9.3 | 33 | | | |
| 11 | 5 | 17 | Fall -- 14 | 7.2 | 43 | | | |
| 12 | 6 | 56 | Fall -- 17 | 27 | 48 | | | |
| 13 | 10 | 28 | Fall -- 28 | 16 | 57 | | | |
| 14 | 18 | 35 | Fall -- 27 | 5.3 | 15 | | | |
| 15 | 2 | 6.6 | Fall -- 11 | 2.4 | 36 | | | |
| 16 | 9 | 57 | Fall -- 24 | 19 | 33 | | | |
| 17 | 8 | 33 | Fall -- 27 | 15 | 46 | | | |
| 18 | 6 | 7.2 | Fall -- 14 | 0 | 0 | | | |
| 19 | 7 | 23 | Fall -- 13 | 4.7 | 20 | | | |
| 20 | 8 | 30 | Fall -- 24 | 5.9 | 20 | | | |
| 21 | 18 | 92 | Fall -- 28 | 27 | 29 | | | |
| 22 | 26 | 125 | Fall -- 35 | 50 | 40 | 160 | Rise -- 28 Fall -- 35 | 320 80 |
| 23 | 7 | 7.4 | Fall -- 10 | 2.3 | 31 | Neg. | Rise -- 10 Fall -- 17 | 20 Neg. |

* Noted in days after inoculation with *Plasmodium malariae*

exception noted, the titer in each instance dropped to a level less than 60 per cent of the initial titer and in 7 instances the fall was to 20 per cent or less. Flocculation tests were done on 6 of the 23 patients. Only 1 showed a fall in Kahn units paralleling the drop in complement-fixation titer. The other 5, including the patient who showed no fall in complement-fixation

titer, showed a significant rise in the level of Kahn units, although a subsequent fall was noted before the termination of the infection. Of the 10 patients with latent syphilis who were inoculated with *P. malariae* (Table 2), 8 showed a fall in complement-fixation titer to less than 60 per cent of the initial level. In 2 instances this fall was first noted just after, rather than prior

TABLE 2

The Changes in the Quantitative Serologic Titer in 10 Patients with Late Latent Syphilis during the Course of Induced Plasmodium Malariae Infection

| Case Number | First Paroxysm * | New York State Complement-fixation Titer | | | | Kahn Flocculation Units | | |
|-------------|------------------|--|-------------------|-----------------|---------------------------|-------------------------|--------------------------|----------------|
| | | Initial Titer | Trends Observed * | Maximum Changes | | Initial Titer | Trends Observed * | Levels Reached |
| | | | | Titer | Per cent of Initial Titer | | | |
| 24 | 19 | 35 | Fall — 21 | 15 | 43 | 40 | None | .. |
| 25 | 20 | 33 | None | .. | .. | 20 | Rise — 33 | 120 |
| 26 | 18 | 45 | Fall — 18 | 24 | 53 | 20 | Rise — 11 Fall — 23 | 400 4 |
| 27 | 16 | 20 | Fall — 17 | 4.6 | 23 | 20 | Rise — 19 Fall — 21 | 80 20 |
| 28 | 13 | 42 | Fall — 17 | 14 | 33 | 20 | Rise — 17 Fall — 19 | 200 20 |
| 29 | 25 | 21 | Fall — 35 † | 10 | 48 | 40 | Rise — 21 Fall — 31 | 120 20 |
| 30 | 5 | 36 | None | .. | .. | 40 | Rise — 12 | 320 |
| 31 | 6 | 22 | Fall — 20 † | 13 | 59 | Neg. | Rise — 15 Fall — 22 † | 80 4 |
| 32 | 8 | 17 | Fall — 15 | 10 | 59 | 2 | Rise — 15 Fall — 17 | 120 3 |
| 33 | 5 | 17 | Fall — 10 | 8.2 | 48 | 40 | Rise — 3 Fall — 10 | 120 20 |

* Noted in days after inoculation with *Plasmodium malariae*

† Change observed after last malarial paroxysm during anti-malarial therapy

TABLE 3

The Changes in the Quantitative Serologic Titer in 11 Patients with Central Nervous System Syphilis during the Course of Induced Plasmodium Vivax Infection

| Case Number | First Paroxysm * | New York State Complement-fixation Titer | | | | Kahn Flocculation Units | | |
|-------------|------------------|--|-----------------------|-----------------|---------------------------|-------------------------|------------------------|----------------|
| | | Initial Titer | Trends Observed * | Maximum Changes | | Initial Titer | Trends Observed * | Levels Reached |
| | | | | Titer | Per cent of Initial Titer | | | |
| 34 | 5 | 10 | Rise — 13 | 98 | 980 | | | |
| 35 | 5 | 15 | Fall — 8 | 5.3 | 35 | 20 | Rise — 15 | 400 |
| 36 | 3 | 27 | Rise — 13 | 50 | 185 | 20 | Rise — 11 | 200 |
| 37 | 4 | 94 | Fall — 9 Rise — 12 | 58 130 | 62 138 | 80 | Rise — 12 | 600 |
| 38 | 8 | 25 | Fall — 13 | 10 | 40 | Neg. | Rise — 11 Fall — 18 | 400 Neg. |
| 39 | 7 | 13 | Fall — 9 | 2.9 | 22 | Neg. | Rise — 11 Fall — 16 | 240 3 |
| 40 | 6 | 32 | Fall — 11 | 16 | 50 | 80 | None | .. |
| 41 | 3 | 50 | None | .. | .. | 120 | None | .. |
| 42 | 13 | 33 | None | .. | .. | 120 | None | .. |
| 43 | 7 | 160 | Fall — 13 | 85 | 53 | Neg. | Rise — 13 Fall — 18 | 600 200 |
| 44 | 6 | 13 | Fall — 13 | 3.7 | 28 | 3 | Rise — 13 Fall — 18 | 40 Neg. |

* Noted in days after inoculation with *Plasmodium malariae*

to, the last paroxysm. Kahn tests were done on all of these individuals. Nine exhibited a significant rise in titer, followed in 7 instances by a subsequent fall. The 2 patients in whom a subsequent fall in Kahn units failed to occur were the same individuals who had exhibited no fall in complement-fixation titer.

Thus, of 33 syphilitic patients treated with quartan malaria, 30 exhibited a progressive fall in the complement-fixation titer for syphilis during the induced malarial infection. Of 16 of the 33 on whom quantitative Kahn tests were performed, 14 exhibited an increase in Kahn units, 1 a decrease, and 1 showed no change at all. In 12 of the 14 who showed an increase in Kahn units a subsequent fall occurred before or just after the last malarial paroxysm.

Among the 11 patients with central nervous system syphilis who were treated with *P. vivax* infection (Table 3), 6 showed a progressive fall in complement-fixation to less than 60 per cent of the initial level, and 2 exhibited no significant changes. Three individuals showed a rise in titer although in 1 case this was preceded by a preliminary fall. Flocculation tests were done in 10 of these individuals. An increase in Kahn units was noted in 7 patients, in 4 of whom a subsequent fall occurred. No changes appeared in 3 individuals, 2 of whom had likewise shown no change in complement-fixation titer.

Graphic illustrations of the serologic changes during therapeutic malaria in 4 patients selected from the above groups, together with accompanying descriptive legends, are presented in Figures 1, 2, 3, and 4.

In the control observation group, of 50 patients treated with fever induced by intravenous typhoid vaccine combined with intensive arsenotherapy, only 14 exhibited a fall in complement-fixation titer to 60 per cent or less of the initial level. Seven patients showing a drop in titer were among the 25 with central nervous system syphilis and the remaining 7 were of the 25 with latent syphilis. Of 25 patients with latent syphilis who received only intensive mapharsen therapy by the intravenous drip technic, only 2 exhibited a significant drop in complement-fixation titer during the period of therapy. Increases in complement-fixation titer were noted in only 10 per cent and 8 per cent of these two control groups respectively.

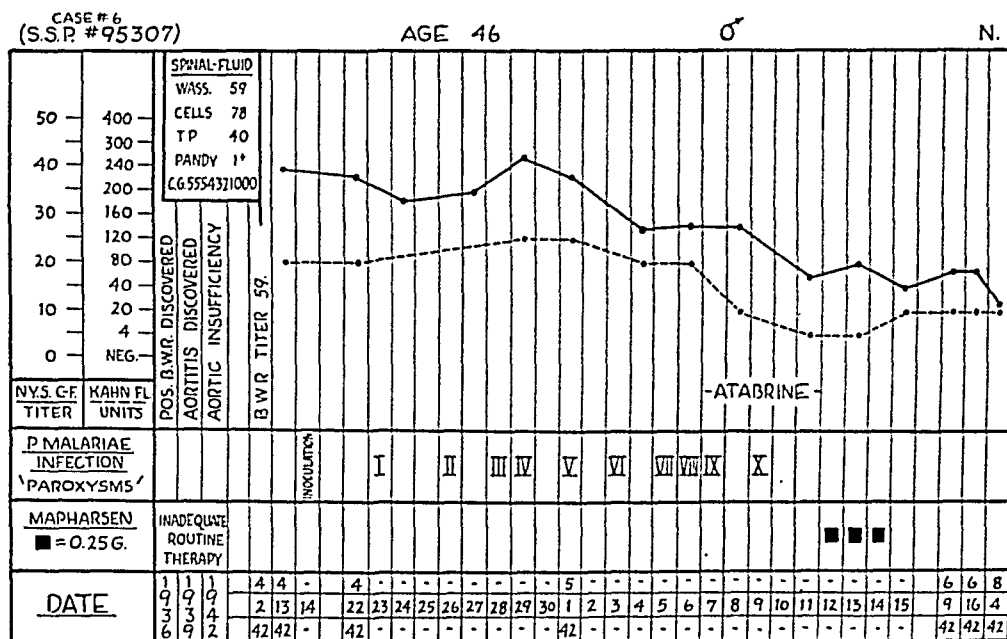
In Table 4 is presented a summary of the serologic changes in the several treatment groups. No differentiation between the patients with latent and central nervous system syphilis is made because of the similarities in the serologic changes as noted above.

The 6 patients in the *P. malariae* group who had been vaccinated with *E. typhosa* antigen a few weeks prior to inoculation showed no significant variation in *E. typhosa* agglutination

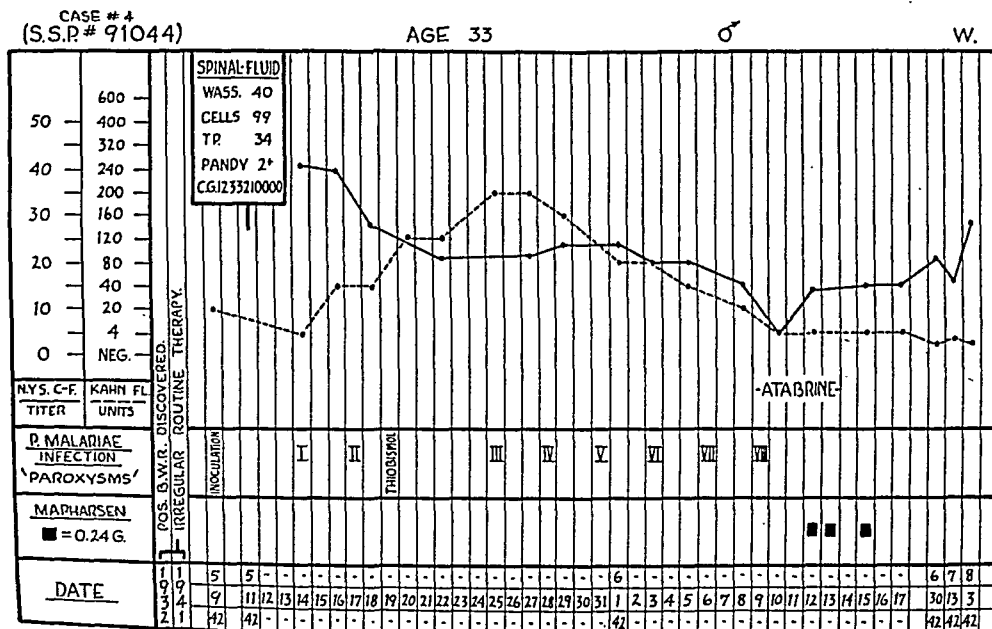
TABLE 4
Summary of Major Serologic Trends in Syphilitic Individuals during Various Methods of Therapy

| Method of Therapy | New York State Complement-fixation Titer | | | | | Kahn Flocculation Units | | | | |
|--|--|---------------|----------|---------------|----------|-------------------------|---------------|----------|---------------|----------|
| | Patients Tested | Fall in Titer | | Rise in Titer | | Patients Tested | Fall in Titer | | Rise in Titer | |
| | | No. | Per cent | No. | Per cent | | No. | Per cent | No. | Per cent |
| <i>P. malariae</i> infection | 33 | 30 | 91 | 0 | 0 | 16 | 1 | 6 | 14 | 88 |
| <i>P. vivax</i> infection | 11 | 6 | 55 | 3 | 27 | 10 | 0 | 0 | 7 | 70 |
| Typhoid vaccine fever with intensive arsenotherapy | 50 | 14 | 28 | 5 | 10 | | | | | |
| Intensive mapharsen drip therapy | 25 | 2 | 8 | 2 | 8 | | | | | |

CASE # 6
(S.S.P. # 95307)



CASE # 4
(S.S.P. # 91044)



| CASE # 35 (S.S.P. #100921) | | AGE 46 | | ♂ | | W. | | | | | | | |
|--|--|--|--|---|--|----|--|--|--|--|--|--|--|
| SPINAL FLUID WASS 22 CELLS 7 T.P. 51 PANDY 2* C.65554321000 | | | | | | | | | | | | | |
| POS. BWIR. AND C.S.F. N.Y.S. C.F. TITER KAHN FL. UNITS | | - QUININE - | | | | | | | | | | | |
| P. VIVAX INFECTION 'PAROXYSMS' | | I II III IV V VI VII VIII | | | | | | | | | | | |
| MAPHARSEN ■ = 0.20 G. | | ■ ■ ■ | | | | | | | | | | | |
| DATE | | 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 1 2 3 4 5 6 7 8 | | | | | | | | | | | |

[illegible]

titer during the course of the malarial infection although 5 of the 6 showed considerable falls in the titer of the complement-fixation tests for syphilis.

COMMENTS

The importance of the serologic method in demonstrating alterations in reagin content has previously been demonstrated by Kitchen, Webb, and Kupper, and more strikingly by Burney, Mays, and Iskrant in their studies showing the development of false positive reactions for syphilis in non-luetics during therapeutic malaria. Kitchen and his collaborators noted definite differences in the results of the flocculation and complement-fixation tests done upon individual specimens during the course of either *P. vivax* or *P. falciparum* infections. Burney, Mays, and Iskrant, employing 9 different technics, found marked variations in the frequency of false positive reactions for syphilis during the course of vivax infections, some tests exhibiting few or no positive reactions whereas others showed positive reactions among each of the 11 individuals studied. In the recently published report of the Washington Serology Conference,⁹ wherein different laboratories performed individual tests, considerable variations were again noted, the different technics giving positive results in from none to 75 per cent of the 12 cases of malaria tested. Differences in reagin appearance relative to the species of parasite used was noted by Kitchen, Webb, and Kupper, who observed that vivax infections tend to induce a greater proportion of positive serologic results during the course of the disease than did falciparum infections.

Our observations show that definite trends in the quantitative serologic tests occur in syphilitic individuals during the course of induced *P. malariae* infection, but that the direction of the trends is dependent upon the serologic

test employed. The different curves presented by the quantitative complement-fixation and flocculation tests for syphilis would appear to be governed by the specificity of the individual methods. The New York State complement-fixation test has previously been shown to possess high specificity. In the Washington Serology Conference referred to above this test revealed only one doubtfully positive reaction among 12 patients with malaria. Our results with quartan malaria seem to confirm this specificity as none of our patients showed an increase in titer over that recorded before inoculation with *P. malariae*. The downward trend of the complement-fixation titer may represent the development of an actual anti-reagin agent or of a factor which interferes with the demonstration of reagin by this method. In either case the depression in titer does not seem permanent as in several patients who have been followed sufficiently long the titer tends to approach its original level after a few months. No patients have been followed long enough to warrant any conclusion regarding a possible relationship between the depression in titer and the therapeutic results.

The most common trend of the Kahn and New York State flocculation tests during quartan malaria was a sharp rise in titer followed by a fall to or below the initial level usually before the termination of the infection. Based upon the work of others^{1, 2} the preliminary rise in titer would appear to be consistent with the development of a false positive test for syphilis in non-luetics during malarial fever and would indicate that the two flocculation tests are not quite so specific as the New York State complement-fixation test. In the syphilitic patient this probably represents a false positive reaction superimposed upon a true positive reaction. The tendency of the titer to fall

during the course of the infection differs from the trend noted among non-luetic in whom the newly acquired positivity often persists for 1 or more weeks after the last paroxysm. It is interesting and possibly significant that, of the 14 syphilitic patients who exhibited a rise in flocculation titer, the only 2 who failed to show a subsequent fall had also failed to show a fall in complement-fixation titer.

The trends of the serologic tests noted among the syphilitic patients treated with *P. vivax* infection were not nearly so consistent, although in the majority of patients the findings were similar to those exhibited by the *P. malariae* group. The occurrence of a rise in complement-fixation titer in 3 of the 11 patients seems to stress the importance of the species of parasite upon the serologic response, as Kitchen, Webb, and Kupper have noted (vide supra).

Ellingson and Clark¹⁰ have recently reported experiments demonstrating a rapid reduction in *E. typhosa* antibody titers in typhoid vaccinated rabbits following the induction of severe fever by physical methods. However, fever as a major influence upon the serologic titers in our patients appears to be eliminated by the results of the control groups. Only 28 per cent of the patients treated by fever induced by intravenous typhoid vaccine showed a fall in complement-fixation titer although the febrile bouts in this group were similar in intensity and duration to those observed in the *P. malariae* group in which such a fall was noted in 91 per cent. In addition, at least one instance was observed in which a fall in titer was first noted during the incubation period of quartan malaria prior to the first paroxysm. Arsenotherapy given by the intensive intravenous mapharsen drip appeared to have little effect upon the serologic titers, as significant changes during the

course of treatment occurred very infrequently in patients receiving this type of therapy alone.

Kopp¹¹ has reported the occurrence of marked changes in the plasma proteins in patients with therapeutic malaria. His patients exhibited significant depressions in albumen and usually slight elevations in globulin and fibrinogen, with all factors returning to normal upon termination of the infection. In some cases, the changes were noted before the onset of fever. Fever produced by typhoid vaccine or by the inductotherm caused only slight fluctuations in the plasma protein fractions. Whether these changes in plasma protein bear any relation to the fluctuations in reagin observed in our patients is a matter of speculation.

Our studies on the effect of *P. malariae* infection on induced typhoid antibodies revealed no change in the agglutination titer for *E. typhosa* during the malarial infection, indicating that the effects of this therapeutic method upon the tests for syphilis do not universally extend to other types of serologic reactions.

Interesting in this regard are the studies of Caldwell¹² who, in 1930, noted that the serum of general paralytics who had been treated by induced malaria had a higher titer of agglutinins for cultivated *Treponema pallidum* than the serum of similar but untreated patients. He also noted that an increase in spirocheticidal properties of the serum developed during the course of induced malaria in 6 patients. However, in their studies on the complement-fixation test using cultured spirochetes as antigen, Eagle, Mays, Hogan, and Burney¹³ and Kolmer, Kast, and Lynch¹⁴ found that a high percentage of non-syphilitic persons with natural or induced tertian malaria exhibited false positive reactions by this method. Further studies on the relationship between syphilitic reagin and spirochetal

antibodies are necessary before any correlation can be made between Caldwell's findings and our own.

Recently Dulaney, Stratman-Thomas, and Warr¹⁵ have described the development of high complement-fixation titers for malaria in syphilitic individuals treated with induced infection. Because of the importance of exact details concerned in any one serologic test in influencing the resulting titers it is not possible to compare the results of any procedures not done in identical manner. However, it is interesting that the specific or malaria complement-fixing antibody should be shown to increase while the reagin indicated by the New York State complement-fixation tests decreased.

SUMMARY

1. Changes in quantitative serologic tests in syphilitic individuals during the course of therapeutic malaria depend upon the type of test employed and the species of parasite used.

2. During infection induced by inoculation with *Plasmodium malariae* there was a uniform fall in the New York State complement-fixation titer and a preliminary rise and subsequent fall in the Kahn and New York State precipitation titers. During infection induced by inoculation with *Plasmodium vivax* the serologic changes were most often similar but were not so constant.

3. Fever alone did not seem to be a major factor in the production of the serologic changes.

4. No conclusions are warranted re-

garding any relationship between the changes in serologic titers and potential therapeutic results.

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Effect of the Activated Sludge Process of Sewage Treatment on Poliomyelitis Virus*

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THE demonstration by several investigators¹⁻⁷ of poliomyelitis virus in the stools of patients and healthy carriers and in sewage leads to a question of the ultimate fate of the virus in its passage through modern water and sewage treatment processes. The question is of more than ordinary interest in view of the thesis⁸⁻¹¹ that the transmission of the disease may be through the gastrointestinal tract. This suggestion would throw suspicion upon water supplies as possible hazards in the spread of the disease. Protection against such a potentiality would depend upon the ability of water purification and sewage treatment processes to remove or to destroy the virus.

The first of a series of studies on the effect of water and sewage treatment on the virus was recently presented¹² in the form of a preliminary report of the efficacy of individual water purification units. The present communication is a report of the effect on the virus of the activated sludge process of sewage treatment.

METHODS

General—A strain of poliomyelitis virus adapted for mice was used throughout the experiments. The virus suspension employed in the experiments was prepared from cords and brains of mice killed in the acute stage of the disease and showing paralysis in two or more extremities. These tissues were ground in refined silica and suspended in buffered broth, 1:5. The supernatant from this concentrate was then made up with activated sludge to a dilution of 1:300. Such a heavy inoculum was used in order to ascertain the effect of activated sludge under severe loading with the virus. Furthermore, it was deemed desirable to use quantities of virus that could be readily detected.

The method of investigation consisted of observing the effect on the virus of the activated sludge process under conditions designed to simulate operating conditions usually encountered in this type of sewage disposal practice.

The activated sludge used in the experiments was obtained from the Ann Arbor Sewage Treatment Plant and showed the following chemical and biochemical characteristics:

* This study was aided by a grant from the National Foundation for Infantile Paralysis, Inc.

Ash—16%
 pH of mixed liquor—6.8
 Biochemical oxidizing power—90% removal of 5 day B.O.D. in 6 hours
 Suspended solids removal—95%
 Nitrate—nitrogen produced—15 p.p.m.

Before introducing the virus suspension, the activated sludge was aerated in the laboratory for 24 hours.

The activated sludge, inoculated with virus suspension, consisting of one part concentrated virus suspension to 300 parts mixed activated sludge liquor, was aerated for periods up to 9 hours. Samples were taken from the aeration units at 2 minutes, 3 hours, 6 hours, and 9 hours to represent different detention periods. These samples were allowed to settle and were then centrifuged and portions of the supernatant liquor were inoculated intracerebrally into mice. Concentrations of activated sludge in amounts of 1,100, 2,200 and 3,300 p.p.m. were studied separately in the above described manner.

Aeration Units—The aeration units used in the experiments are shown in the diagrammatic sketches in Figure 1. The unit appearing in the left of the

figure was used in several of the early studies and in the check runs of the investigation. The air entered through the base of the unit into a carborundum ball which dispersed the air throughout the mixture. The degree of dispersion was sufficient to keep the mixture agitated so that all portions were thoroughly aerated. In the second unit the air was introduced through a tapered glass tube placed at the bottom of a liter glass cylinder. The end of the glass tube was narrowed to a small orifice allowing only a fine stream of air to emerge. This method proved to be very efficient both in aeration and in mixing of the sludge.

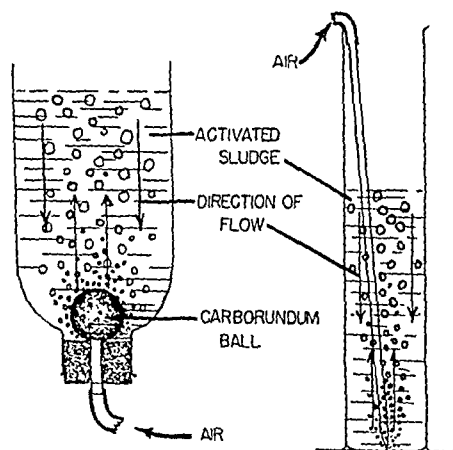
Both units were operated at a rate sufficient to maintain aerobic conditions in the mixture.

The amount of settleable solids were varied to approximate different conditions. The various concentrations of activated solids used were obtained by concentrating two to three times the material obtained from the municipal sewage disposal plant. Control measurements of the activated sludge included repeated determinations of suspended solids, total ash, pH, titrable acidity or alkalinity, ammonia-nitrogen and nitrate-nitrogen.

Sampling—In collecting the samples at consecutive aeration intervals, portions of the supernatant were removed aseptically by suction. The samples were then centrifuged to remove the coarser particles that were impossible to eliminate by the method used in collecting the supernatant liquor. Comparisons were made between centrifuged specimens and gravity-settled specimens; the final results were supernatant liquors of comparable quality. Centrifugation, however, speeded this phase of the work.

Bactericidal treatment—In order to obtain an effluent free from bacteria that might cause complications and death in the animals, the supernatant

FIGURE 1.



ACTIVATED SLUDGE - AERATION UNITS

liquor was treated with chlorine. The addition of chlorine in sufficient concentrations to destroy interfering bacteria was demonstrated not to affect the virus. The bactericidal process consisted of treating the samples to be used for inoculation with chlorine in such quantity that 0.5 p.p.m. residual chlorine was present at the end of 10 minutes' contact time. Residual chlorine was determined by the starch iodide method. All control and activated sludge samples were treated in the same manner.

RESULTS

Paralysis in one or more mice in any test group was deemed to be indicative that the virus was not removed or destroyed by the activated sludge in which it was suspended. Animals dying 1 to 3 days after inoculation were considered to have died from trauma or interfering toxic substances. Those dying without showing paralysis after the first animal in any group had become paralyzed were considered to have died probably from the virus infection, with respiratory paralysis causing the death before paralysis was observed in the extremities. However, in the statistical interpretation of the results, nonparalyzed animals were counted as having succumbed to the virus only if the presence of the virus in each animal so dying could be checked by subsequent passage.

The possibility of the presence of an extraneous virus of neurotropic type in the activated sludge itself had to be considered. This possibility was controlled in all the experiments through inoculation of samples of the supernatant from the activated sludge intracerebrally into test groups of animals. At no time throughout the experiment were results obtained indicative of the presence of such a virus.

The results of the study are shown in Table 1. Four hundred and twenty mice were used in the final experiments with a total of 1,150 animals used al-

together including preliminary studies and various check runs. In Table 1 are shown the results in the control animals and in animals receiving virus suspension subjected to action of three different activated sludge concentrations for three periods of aeration. Three types of control were used. Two of the control series (Nos. 1 and 2 in Table 1) consisted of animals that received the original 1:5 brain cord virus suspension and the 1:300 suspension, the latter equivalent to the dilution used in the activated sludge tests. These dilutions were injected into mice to determine the potency of the virus used. The third control (No. 3) consisted of a group of animals that received the 1:300 suspension of virus subjected to aeration but without addition of activated sludge. This control served to indicate the effect of aeration alone in the absence of any effect of the sludge. Nos. 4, 5, and 6 in the table represent the effect of three different concentrations of activated sludge for different aeration periods.

In the six groups of 30 animals each that received virus-sludge mixture without aeration, 84 were paralyzed, 39 died without showing paralysis, and 58 remained alive of the total of 180 animals. Twenty-one of the 39 deaths were deemed to be due to trauma since the animals died within the first 3 days after inoculation.

It is to be noted that in the material subjected to aeration for 6 hours, paralysis occurred only in the control group of mice that received material subjected to aeration but containing no activated sludge. Although a few animals died that received virus-sludge mixture after aeration, the numbers are small and the preponderance of survivals is very great. The results are even more striking in the group of 120 mice that received material aerated for 9 hours. Here again paralysis occurred only in those animals that received virus

TABLE 1

| No. | Suspended Solids p.p.m. | No. Mice | Hours | | | | | | | | | Material Used for Inoculation |
|-----|----------------------------|-------------|---------|----|-----|---------|----|-----|---------|----|-----|---|
| | | | 0 Hours | | | 6 Hours | | | 9 Hours | | | |
| | | | P | D | Dis | P | D | Dis | P | D | Dis | |
| 1 | 0 | 30 | 24 | 6 | — | .. | .. | .. | .. | .. | .. | Virus control 1-5 non-aerated |
| 2 | 0 | 30 | 18 | 4 | 8 | .. | .. | .. | .. | .. | .. | Virus control 1-300 non-aerated |
| 3 | 0 | 90 | 14 | 6 | 10 | 11 | 10 | 9 | 7 | 3 | 20 | Virus control 1-300 aerated |
| 4 | 1,100 | 90 | 8 | 12 | 10 | 0 | 6 | 24 | 0 | 1 | 29 | Virus 1-300 — Activated sludge plus aeration |
| 5 | 2,200 | 90 | 13 | 5 | 12 | 0 | 3 | 27 | 0 | 1 | 29 | Virus 1-300 — Activated sludge plus aeration |
| 6 | 3,300 | 90 | 7 | 6 | 17 | 0 | 1 | 29 | 0 | 1 | 29 | Virus 1-300 — Activated sludge plus aeration |

P = Animals paralyzed

D = Animals dying without developing paralysis

Dis = Animals remaining alive

suspension subjected to aeration in the absence of activated sludge. Of the 90 animals receiving virus-sludge mixture subjected to 9 hours' aeration, none became paralyzed and only 3 died in the course of the experiment.

DISCUSSION

Although the difficulties encountered in rendering activated sludge mixtures nontoxic for animals may account for the death of some animals, the study of the results of these experiments indicate that activated sludge in concentrations as low as 1,100 p.p.m. has largely removed the virus (as tested for in the supernatant liquor) in a 6 hour aeration period, and that the sludge in amounts of 1,100, 2,200, and 3,300 p.p.m. at 6 and 9 hours' aeration periods removed the virus sufficiently from the liquor to make it almost completely noninfective when injected intracerebrally into mice.

The sludge without prolonged aeration appeared to have no great affinity for prompt adsorption of the virus. In the series of animals tested, 14 mice of the control group of 30 animals were paralyzed against 8, 13, and 7 respectively in the similar groups that received virus after exposure to the three concentrations of sludge. The effect of

aeration without the presence of activated sludge is shown in Line 3 of Table 1. Virus removal or inactivation may have been effected to some degree by prolonged aeration since the number of mice paralyzed decreased from 14 in the group of 30 receiving nonaerated virus suspension to 7 in the group that received virus suspension aerated for 9 hours. Aeration of the virus suspension in dilution of 1:300 caused some precipitation of the protein material so that after the 6 and 9 hour periods there appeared an accumulation of shreds (brain and cord protein) floating on the surface or adhering to walls of the aeration units. This may have been responsible for removal of some of the virus.

The mechanism of removal or destruction of poliomyelitis virus in the activated sludge process of sewage treatment is not clear. Further experiments are needed to determine what proportion of the action of the sludge on virus may be due to adsorption in a mechanical fashion, to partial precipitation by aeration, or to virucidal, oxidative, or enzymatic activity of the sludge.

SUMMARY

Investigations have been made of the effect of the activated sludge process as used in municipal sewage disposal

plants on the removal or inactivation of a mouse adapted strain of poliomyelitis virus. Virus suspension 1:300 was used in sludge concentrations of 1,100, 2,200, and 3,300 p.p.m. with aeration periods of zero, 6 and 9 hours.

The results indicate that activated sludge in amounts as low as 1,100 p.p.m. with 6 hours' aeration will remove or inactivate the virus to a sufficient extent to reduce greatly infectivity for mice injected intracerebrally. Heavier concentrations of sludge with longer aeration periods largely eliminate infectivity.

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Tuberculosis Survey among the Employees of Santiago, Chile*

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THROUGH the efforts of the then Minister of Social Welfare, Dr. E. Cruz Coke, the Preventive Medicine Law was passed in 1938.

This is an official compulsory health insurance for private employees. It covers a middle class group made up of employees in commerce and the professions whose duties are chiefly intellectual and who receive their remuneration from private capital but are not covered by Labourers Insurance.

The operation of the Law is made possible by a 2 per cent tax on salaries, shared equally by employee and employer. The law provides for the annual physical examination of employees and free treatment for those who are found to have tuberculosis, syphilis, or circulatory disease in a curable form.

Offices and a special medical staff have been provided for carrying on examinations and treatment. The staff includes a group of internists, who take the history and make the general physical examination of the employee; a laboratory group; x-ray group; and specialists in tuberculosis, syphilis, and circulatory diseases. The employee has a routine history, physical examination, Wassermann and Kahn blood tests, and fluoroscopic examination of the

chest. If he shows signs of tuberculosis, syphilis, or a circulatory disease, he is transferred to the specialist for a more complete examination. A special effort is made to detect tuberculosis and, although fluoroscopy is used, there is no hesitancy in having a roentgenogram if there is any suspicion of a lesion. In fact, of all employees examined 30 per cent had chest plates taken.

In the first two and a half years of the Law's operation in Santiago, 68,854 persons were enrolled and insured. Of these, 25,556 were given a physical examination. Ages ranged from 16 to 65 years, and 75 per cent were men. Of the 25,566, 899, or 3.51 per cent, were found to have lesions of active tuberculosis, and 1,113, or 4.35 per cent, had signs of residual tuberculosis.

In Table 1 the group of employees examined is distributed according to age and sex and the number and percentage of those with active lesions is shown. The curve reaches its peak in the age group 20-29 and then descends rapidly through the upper age groups. If we compare this curve with our general tuberculosis mortality curve by ages, we see that their peaks coincide at the same age, but while the morbidity curve decreases rapidly, the mortality curve drops more slowly and, in fact, remains almost at the same level. We think that tuberculosis mortality after the age of 40 is due in great part to chronic tuberculosis incompatible

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TABLE 1
Employees Examined by Age, Sex and Active Tuberculosis

| Age | Examined | | | Tuberculous | | | Percentages | | |
|-------------|----------|-------|--------|-------------|-------|-------|-------------|-------|-------|
| | Men | Women | Total | Men | Women | Total | Men | Women | Total |
| 16-20 | 966 | 503 | 1,469 | 43 | 17 | 60 | 4.45 | 3.41 | 4.08 |
| 20-29 | 7,075 | 3,638 | 10,713 | 316 | 198 | 514 | 4.47 | 5.45 | 4.79 |
| 30-39 | 5,854 | 1,768 | 7,622 | 151 | 59 | 220 | 2.75 | 3.32 | 2.89 |
| 40-49 | 3,238 | 475 | 3,713 | 68 | 11 | 79 | 2.11 | 2.32 | 2.13 |
| 50 and over | 1,913 | 136 | 2,049 | 16 | 0 | 16 | 0.84 | 0.0 | 0.78 |
| Total | 19,046 | 6,520 | 25,566 | 604 | 285 | 889 | 3.17 | 4.37 | 3.51 |

with an active life. Those individuals whom we examined were active workers with perhaps less chronic tuberculosis than the general population; hence, the apparent discrepancy between our curves of morbidity and mortality.

In contradistinction to our findings the tuberculosis mortality rate curve of white North Americans ascends progressively with age. Manuel Abreu found the same condition in the survey which he made of employees in Brazil in which the proportion with active tuberculosis lesions increased with age.

This difference between the Chilean curves of mortality and morbidity and those of other countries may indicate that we are passing through an epidemiological phase of maximum infection in which the disease has not yet shown a tendency to decrease spontaneously.

With regard to sex there is noted a higher morbidity among females during the reproductive period. Probably the phenomena of the sexual life of the

woman, such as menstruation and pregnancy bring about modifications in the defense mechanisms against infection.

The economic situation of this group can only be studied indirectly, that is, by grouping all private employees of Santiago according to daily wage, and then comparing the percentages of the 899 cases in each of these income divisions. This is shown in Table 2.

U. C. D. is the amount of money received per person per day. It is obtained by dividing the monthly income by 30, and that amount in turn by the number of individuals in the family.

If the income has a definite influence on morbidity rates we should expect to find these rates higher among the lower income groups. This, however, is not the case and, as we note in the above Table 2, there is a higher proportion of cases among those receiving more income per capita. Forty-three per cent of the cases were in the higher income group which made up only 23 per cent of the group studied.

Since these observations contradict our belief that the incidence of tuberculosis is influenced by the economic factor, it is necessary to make a more detailed study of a larger group of people than those included in this particular work. In order to obtain a more complete picture in Table 3 we have divided the provinces of Chile into groups according to the average salaries paid during the year 1939. In these

TABLE 2
Percentage of 889 Cases in Each Economic Group

| U.C.D. (pesos) | Per cent of Active Cases | Per cent of Employees of Santiago |
|-------------------|-----------------------------|---|
| Less than 4.10 | 16.1 | 17.3 |
| 4.10-10.40 | 41.3 | 59.5 |
| 10.50-20.80 | 32.0 | 15.6 |
| 20.80 and over | 10.6 | 8.6 |
| Total | 100.0 | 100.0 |

U.C.D. = Average daily salary per household member
One Chilean peso is equal to \$0.03

TABLE 3

Provinces of Chile according to Average Salary Paid

| <i>Weekly Salary (Dollars)</i> | <i>Provinces</i> | <i>Average Mortality Rate from Tubercu- losis (1937-1938)</i> | <i>Average Infant Mortality Rate (1937-1938)</i> |
|------------------------------------|---|---|--|
| More than \$3.00 | Magallanes, Coquimbo, Atacama, O'Higgins | 253.5 | 188.5 |
| From \$2.28 to \$2.97 | Antofagasta, Tarapaca, Santiago, Valparaiso, Malleco, Aysen | 271.4 | 206.6 |
| From \$1.86 to \$2.25 | Cautin, Colchagua, Aconcagua, Maule, Concepcion, Arauco, Bio-bio, y Curico | 197.0 | 261.6 |
| Less than \$1.86 | Linares, Valdivia, Talca, Ñuble, Llan- quihue, y Chiloé | 190.0 | 271.8 |

groups of provinces we have obtained the tuberculosis mortality rates. Infant mortality rates, since they are our best statistical indication of economic status, have also been included. The highest infant mortality rates are in those provinces with the lowest income. The tuberculosis mortality rates, however, as in the previous table, are higher in those provinces where economic conditions are better.

It is interesting to note that Abreu in a similar study of municipal employees in Brazil found the same condition as in Chile with a higher percentage of active cases among the upper income groups. This is illustrated in Table 4.

TABLE 4

*Tuberculosis among Municipal Employees in
Brazil Classified according to Salary
(From Dr. Manoel de Abreu)*

| <i>Monthly Salary (dollars)</i> | <i>Per cent of Active Tuberculosis</i> |
|-------------------------------------|--|
| \$17.75 | 2.38 |
| \$31.50 | 3.00 |
| \$45.00 | 2.07 |
| \$60.00 | 4.82 |
| \$60.20 and over | 3.28 |

From these observations we are inclined to conclude that tuberculosis morbidity is not influenced by financial income in Chile. Probably the idea

that tuberculosis is an economic disease is due to the fact that the prognosis varies directly with the economic status of the patient.

TABLE 5

Per cent of Healed Classified by Salary

| <i>U.C.D. (pesos)</i> | <i>Per cent of Healed</i> |
|---------------------------|---------------------------|
| Less than 4.10 | 52.4 |
| 4.10 to 10.40 | 66.5 |
| 10.50 to 20.80 | 68.2 |
| 20.90 and over | 76.2 |

In order to determine the relationship of economic status and response to treatment, we have divided the persons treated into two groups, those who showed a favorable response, and those who showed no improvement. Table 5 gives the percentage of favorable responses to treatment in each of the various income per person per day groups, and illustrates clearly the higher number of cures among the upper income patients.

From these observations we are inclined to think that many individuals of good economic status having tuberculosis lesions without symptoms are cured spontaneously while many of those whose standard of living is lower become progressively worse. (Logically in this survey in which the majority of the lesions discovered are producing no

symptoms, the percentage of active lesions does not vary with the economic status of the groups examined.)

Unfortunately, the Preventive Medicine Law does not provide for the examination of family contacts, and for this reason it is impossible for us to investigate the relationship of economic status to communicability. It is only possible for us to group the individuals studied according to diagnosis and then compare these groups with reference to history of contact.

In Table 6 we have considered the individuals to have a history of contact if in their families there was an active case of tuberculosis under the care of a physician or a death from tuberculosis in recent years. This analysis demonstrates the importance of the contact factor in the spread of the disease. Attention is called to the fact that 16.7 per cent of those found with active lesions gave a positive history of contact, while only 0.9 per cent of those with no lesions gave such a history. This figure is similar to that obtained by us in the study of a small group of families of patients hospitalized for tuberculosis, in which we found 23 per cent of family contacts with active asymptomatic lesions. Professor Sayé in a recent investigation in Chile found that 22 per cent of individuals in familial contact with open cases of tuberculosis showed active lesions. (This high figure demonstrates the im-

portance of carrying antituberculosis activities to the family of the patient.)

TABLE 6
History of Exposure to Open Cases

| <i>Diagnosis</i> | <i>Persons Examined</i> | <i>Per cent with Contact History</i> |
|---|-------------------------|--------------------------------------|
| Healthy | 20,351 | 0.9 |
| Residual Tuberculosis | 1,316 | 9.1 |
| Active Tuberculosis (Minimal and Moderately Advanced) | 645 | 16.3 |
| Far Advanced Tuberculosis | 36 | 25.7 |

Residual tuberculosis is lesions without clinical significance and so these persons were not included among the tuberculous cases in Table 1.

The difference in the number of persons examined between Table 1 and Table 6 can be explained because we could not find any reference about exposure in 208 of the patients and in 3,000 of those classified as healthy, residual or not.

From Table 6 it is easy to see how much more important is the contact factor than the economic factor in the prevalence of tuberculosis in Chile. Unfortunately, tuberculosis has been looked upon as an economic disease, and for this reason the problem has been taken up by politicians and has been attacked chiefly by the economist rather than the epidemiologist.

Of the 889 individuals diagnosed as having active tuberculosis it is possible at this time to present figures on 461 closed cases. Of these 461, the first diagnosis was minimal lesion 178, moderately advanced 196, and far advanced 87. In Table 7, these are classified according to their condition at the time of discharge. The more advanced

TABLE 7
Stage at Time of Discharge Classified according to First Diagnosis

| <i>Status at Discharge</i> | <i>First Diagnosis</i> | | |
|----------------------------|------------------------|----------------------------|---------------------|
| | <i>Minimal</i> | <i>Moderately Advanced</i> | <i>Far Advanced</i> |
| Cured | 162 | 122 | 4 |
| Improved | 11 | 30 | 11 |
| Unchanged | 2 | 23 | 45 |
| Worse | 3 | 21 | 27 |
| Total | 178 | 196 | 87 |

Deaths are not included because those who become worse or are unchanged after a reasonable period of time are discharged, and the Service does not know anything more about them.
The people classified as improved are those considered cured but without the gastric lavage which can prove it.

the disease at the time of discovery, the less favorable was the outcome.

In Table 8 this group of patients is classified according to progress of infection in relation to age. Although it appears that the percentage of cured or improved is higher among the lower age groups, the numbers in the upper ages are too small for comparison.

If we classify those who were discharged as cured we find that the average period of treatment for those with minimal lesions was 12.6 months, whereas those with moderately advanced lesions were treated 17.1 months, and those with advanced lesions 19.5 months.

This study gives us a clear idea of

TABLE 8
Stage at Discharged Classified by Age

| Age | Cured | Per cent | Improved | Per cent | Unchanged | Per cent | Worse | Per cent |
|-------------|-------|----------|----------|----------|-----------|----------|-------|----------|
| Less 20 | 22 | 64.7 | 5 | 14.7 | 3 | 8.8 | 4 | 11.7 |
| 20-29 | 183 | 67.0 | 31 | 11.3 | 29 | 10.6 | 30 | 11.0 |
| 30-39 | 62 | 59.6 | 12 | 11.5 | 21 | 20.2 | 9 | 8.6 |
| 40-49 | 20 | 50.0 | 2 | 5.0 | 14 | 35.0 | 4 | 10.0 |
| 50 and over | 2 | 20.0 | 0 | ... | 5 | 50.0 | 3 | 30.0 |
| Total | 289 | | 50 | | 72 | | 50 | |

In studying the care received we find that 81 per cent of those treated in a sanatorium showed improvement, as against 70 per cent of those treated at home. The difference is probably significant as sanatorium cases were selected from those with a less favorable prognosis. There is no difference between the percentages of men and women who showed improvement under treatment.

the economy in cost of treatment obtained by discovering cases in the early stages of the disease.

This report is only in the nature of a preliminary communication. It is an attempt to pause for a moment and take stock of what is being done with the hope that we may correct errors and direct our steps toward bringing about the best possible results.

Public Health and Economic Aspects of Pneumonia—A Comparison with Pre-sulfonamide Years

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THE spectacular results which have attended the use of sulfonamide drugs in pneumonia have simplified therapy of a disease, which until a few years ago called for the exercise of all the therapeutic resources and ingenuity at the physician's command. Inevitably, this has led to an attitude of almost casual optimism. While the prognosis in the individual case has improved tremendously, the present study, undertaken to determine what influence the newer therapy has had on public health and economic aspects of pneumonia, emphasizes that pneumonia remains a major problem in public health.

Valid morbidity data are notoriously difficult to obtain. Analysis of pneumonia experience among the personnel of several large industrial organizations carrying group health and life insurance with the Equitable Life Assurance Society of the United States, appeared to provide a satisfactory method whereby the prevalence of pneumonia and certain other aspects could be studied. The groups reviewed comprised a large number of diversified industries throughout the United States, totalling over 100,000 employees of average industrial age distribution (Table 1). The findings, therefore, may be considered representative of the entire industrial population, rather than

reflecting the particular trend in any one industry, age group, or locality. All cases of pneumonia were included in the analysis excepting those where pneumonia occurred terminally or as a complication of another disabling illness. The recent report on "A Nationwide Study of the Bacterial Etiology of the Pneumonias"¹ indicates that pneumococci are responsible for more than three-fourths of all pneumonias.

TABLE 1

(a) *Age Distribution of Employed Persons*

| Age Group | Equitable Life Study Per cent | U. S. Census Study 1940 December 14, 1942 Per cent |
|-----------|--|---|
| 14-19 | 3 | 6 |
| 20-24 | 12 | 12 |
| 25-34 | 36 | 26 |
| 35-44 | 26 | 22 |
| 45-54 | 15 | 19 |
| 55-64 | 6 | 11 |
| Over 64 | 2 | 4 |
| | 100 | 100 |

(b) *Type of Industries Covered in Equitable Life Study*

Street Railway and Bus Transportation
Coal Mining
Baking and Confectionery
Chemical Manufacturing (Explosives, Paints, Fertilizers, Soaps)
Manufacturing of Textiles, Rubber Tires and Tubes and Automobile Parts
Cigarettes, Cigars and Smoking Tobacco
Department Store

In order to ascertain what influence the advent of sulfonamide therapy has exerted on the prevalence, mortality,

and duration of illness in pneumonia, the years 1935 to 1937 inclusive were compared with the period from January 1, 1939, to June 1, 1942. The year 1938 was not included since this was a transition period when sulfonamide therapy was being introduced in the treatment of pneumonia. The average exposure in the first period was 100,364 lives, and in the second period 123,962 lives.

INCIDENCE

The frequency of pneumonia by quarters and years is indicated in Table 2. The incidence of pneumonia, as revealed in studies conducted by The U. S. Public Health Service,² is shown for comparison. The public health data are comparable to our findings, being based similarly on pneumonia experience among large industrial groups throughout the United States.

The findings in both studies are graphically summarized in Figures 1 and 2.

It is observed that the incidence rates and trends in both series check quite closely. The over-all average shows an incidence rate of 2.6 per 1,000 in the first period (pre-sulfonamide), compared with 3.0 per 1,000 in the second period. The public health data show an incidence rate of 2.6 per 1,000 in the first period, and in the second period a somewhat greater increase to 3.4 per 1,000.

An increase in the incidence of pneumonia since 1939 is evident in both series and is much more striking in the public health survey. The greater increase in the public health survey, however, may be apparent rather than real for the public health study includes only pneumonia cases of over 8 days' duration, so that no cases with a fatal

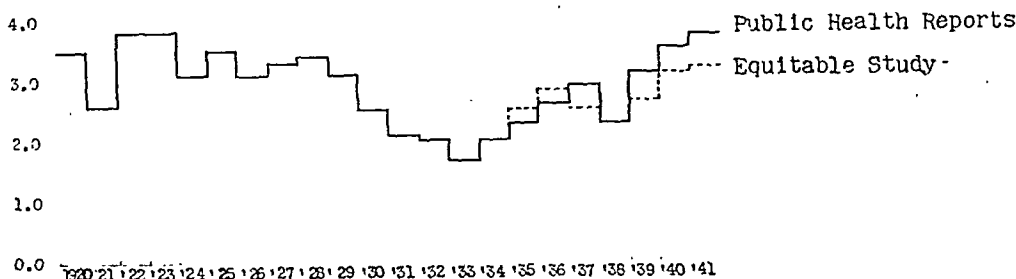
TABLE 2
Pneumonia Incidence per 1,000

| Period | Equitable Life Assurance Society of the U. S. | | | | Public Health Reports Study of Disabling Morbidity among Industrial Workers | |
|------------------|---|------------------------|-------------------|----------------|--|----------------|
| | Lives Exposed | Pneumonia Incidence | Quarterly Rate | Annual Rate | Quarterly Rate | Annual Rate |
| 1st Quarter 1935 | 91,174 | 85 | 3.73 | | 3.8 | |
| 2nd " " | 92,186 | 65 | 2.82 | | 2.4 | |
| 3rd " " | 92,451 | 24 | 1.04 | 2.51 | 1.1 | 2.3 |
| 4th " " | 95,217 | 59 | 2.48 | | 2.2 | |
| 1st Quarter 1936 | 96,199 | 116 | 4.82 | | 4.9 | |
| 2nd " " | 94,397 | 53 | 2.25 | | 2.7 | |
| 3rd " " | 98,837 | 34 | 1.37 | 2.78 | 0.9 | 2.6 |
| 4th " " | 100,935 | 68 | 2.69 | | 2.2 | |
| 1st Quarter 1937 | 105,540 | 108 | 4.09 | | 4.5 | |
| 2nd " " | 109,457 | 49 | 1.79 | | 2.7 | |
| 3rd " " | 111,962 | 48 | 1.71 | 2.52 | 1.5 | 2.9 |
| 4th " " | 112,674 | 72 | 2.56 | | 3.0 | |
| 1st Quarter 1939 | 104,011 | 126 | 4.85 | | 4.7 | |
| 2nd " " | 104,322 | 62 | 2.38 | | 3.3 | |
| 3rd " " | 105,593 | 27 | 1.02 | 2.65 | 1.1 | 3.1 |
| 4th " " | 108,434 | 65 | 2.40 | | 3.2 | |
| 1st Quarter 1940 | 109,396 | 152 | 5.56 | | 6.1 | |
| 2nd " " | 112,287 | 64 | 2.28 | | 3.5 | |
| 3rd " " | 117,817 | 38 | 1.29 | 3.11 | 1.8 | 3.5 |
| 4th " " | 120,535 | 104 | 3.45 | | 2.7 | |
| 1st Quarter 1941 | 122,223 | 185 | 6.05 | | 5.8 | |
| 2nd " " | 128,336 | 89 | 2.77 | | 4.7 | |
| 3rd " " | 143,273 | 48 | 1.34 | 3.18 | 1.9 | 3.7 |
| 4th " " | 153,458 | 113 | 2.94 | | 2.8 | |
| 1st Quarter 1942 | 161,567 | 187 | 4.63 | | 7.2 | |
| 2nd " " | 166,800 | 83 * | 2.99 | | 4.8 | |

* 2 months only

FIGURE 1
ANNUAL RATES OF PNEUMONIA INCIDENCE
CALENDAR YEARS 1920-1941 INCLUSIVE

Annual Number
of Cases
per 1,000



termination within the first 8 days of illness are included. Thus, the increased number of cases since the introduction of sulfonamide treatment recorded in the public health survey is to be attributed, probably in major degree, to a greater number of cases which now survive. Previously a much greater percentage of cases terminated fatally in less than 8 days and, accordingly, were not listed in the public health survey. In the Equitable data all fatalities in both periods, including deaths within the first 8 days of illness, are included so that the comparison of incidence rates is more valid.

While the omission of fatalities in the public health data invalidates any comparison of incidence rates with pre-sulfonamide years, nevertheless, it is of interest to review the annual incidence of pneumonia prior to 1938. The public health data prior to 1938 may serve in some measure to reflect changes in incidence, even though fatal cases were not included, since the mortality rate did not vary greatly before 1938, although a slight gradual decline in the mortality rate had been manifest for some years probably due to increasing use of oxygen and serum therapy. The annual incidence rate per 1,000 as far

back as 1920 and quarterly rates since 1929 have been abstracted from the periodic public health reports of disabling morbidity among industrial employees, and are presented in Table 3. It is seen that, even excluding deaths in the first 8 days of illness, the incidence of pneumonia was at least as high as, or higher than, the present rate in the decade from 1920 to 1930. Inclusion of fatal cases would raise the annual rates in this period by at least another 20 to 25 per cent so that it must be concluded that pneumonia is no more prevalent, and probably less so, than it was at that time. It is rather interesting to note that during the depression years of 1931 to 1935 pneumonia frequency was at its lowest among the employed. Interestingly enough a similar decrease in the incidence of pneumonia occurred in Sweden during these years.³ The gradual decrease in pneumonia incidence over the period of a decade from 1920 and its gradual rise again during the past 10 years suggests the possibility of a cyclic prevalence such as is known to exist in certain other infectious diseases. Some years ago it was suggested that a 3 year cyclic incidence rate exists for pneumonia,⁴ but this has not been sub-

FIGURE 2
ANNUAL RATES OF PNEUMONIA INCIDENCE
SEPARATE QUARTERS 1929 - 1942 INCLUSIVE

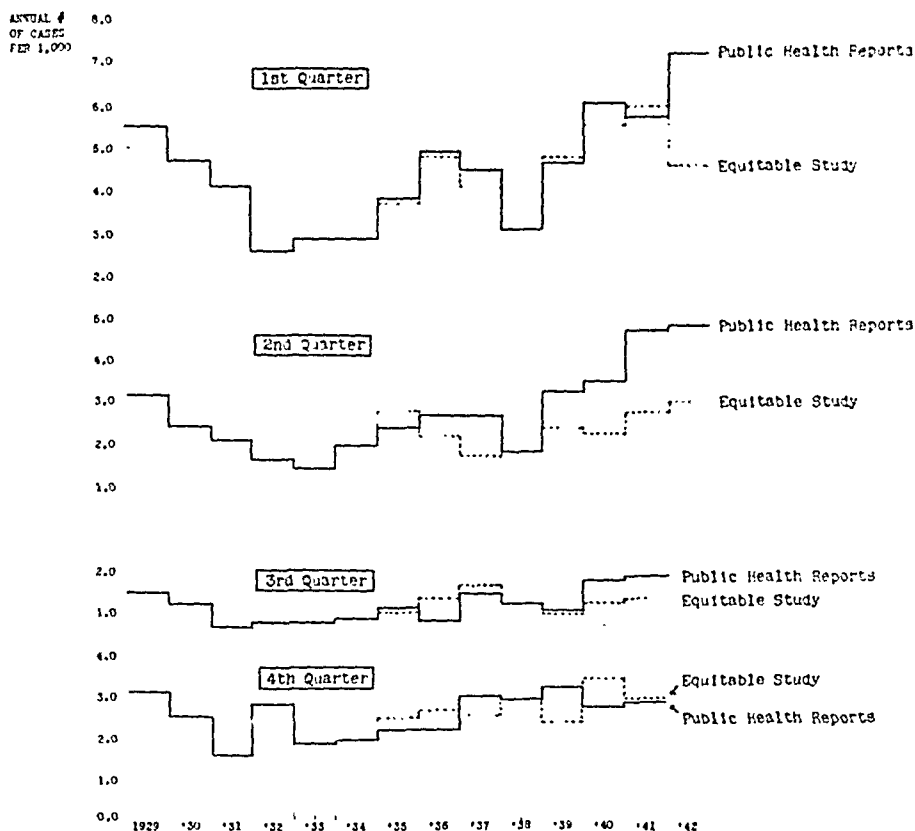


TABLE 3

Pneumonia Incidence per 1,000

Source: Public Health Reports of Disabling Morbidity among Industrial Employees

| Period | Quarterly Rate (Annual Basis) | | | | Annual Rate |
|--------|-------------------------------|-----|-----|-----|-------------|
| | 1st | 2nd | 3rd | 4th | |
| 1920 | 10.3 | 3.9 | 1.7 | 3.3 | 3.5 |
| 1921 | ... | ... | ... | ... | 2.6 |
| 1922 | ... | ... | ... | ... | 3.8 |
| 1923 | ... | ... | ... | ... | 3.8 |
| 1924 | ... | ... | ... | ... | 3.1 |
| 1925 | ... | ... | ... | ... | 3.5 |
| 1926 | ... | ... | ... | ... | 3.1 |
| 1927 | ... | ... | ... | ... | 3.3 |
| 1928 | ... | ... | ... | ... | 3.4 |
| 1929 | 5.5 | 3.2 | 1.5 | 3.1 | 3.1 |
| 1930 | 4.7 | 2.4 | 1.2 | 2.5 | 2.5 |
| 1931 | 4.1 | 2.1 | 0.7 | 1.6 | 2.1 |
| 1932 | 2.6 | 1.7 | 0.8 | 2.8 | 2.0 |
| 1933 | 2.9 | 1.5 | 0.8 | 1.9 | 1.7 |
| 1934 | 2.9 | 2.0 | 0.9 | 2.0 | 2.0 |
| 1935 | 3.8 | 2.4 | 1.1 | 2.2 | 2.3 |
| 1936 | 4.9 | 2.7 | 0.9 | 2.2 | 2.6 |
| 1937 | 4.5 | 2.7 | 1.5 | 3.0 | 2.9 |
| 1938 | 3.1 | 1.9 | 1.3 | 2.9 | 2.3 |
| 1939 | 4.7 | 3.3 | 1.1 | 3.2 | 3.1 |
| 1940 | 6.1 | 3.5 | 1.8 | 2.7 | 3.5 |
| 1941 | 5.8 | 4.7 | 1.9 | 2.8 | 3.7 |
| 1942 | 7.2 | 4.8 | | | |

stantiated. The changing incidence^a is not sufficiently striking to give any credence to the hypothesis that the frequency of pneumonia varies in any regular manner over a period of time. Although a cyclic incidence of pneumonia cannot be claimed, the variation in incidence rates which are seen to have existed prior to 1938 indicate that little specific significance can be attached to the increase in incidence of pneumonia to 3.0 per 1,000 during the past 3 years as compared with an incidence rate of 2.6 per 1,000 in the 3 year period preceding the use of sulfonamides.

CASE FATALITY RATES

Mortality studies are unanimous in revealing a marked decrease in the pneumonia death rate since 1938. The New York City death rate from pneumonia per 100,000 population over the past decade is summarized in Table 4.⁵ Analysis of pneumonia deaths among the industrial workers studied by us shows the death rate per 100,000 to be 54.7 for the period 1935 to 1938, compared with 11.9 for the period 1939 to June 1, 1942. The decrease in the industrial group is much more striking than in the general population. The death rate in both periods is likewise much lower in the industrial group than in the population as a whole; which is to be expected, since pneumonia death rates are highest at the extremes of life in age groups not included in the industrial population. It is of interest to note further that the death rate has fallen much more among the industrial age group than in the general population, suggesting that the sulfa drugs are of greatest benefit between the ages of 15 and 65. Beyond the age of 65 where pneumonia frequently is complicated by other serious illnesses, therapy with the sulfa drugs appears to be somewhat less efficacious.

TABLE 4

*Pneumonia Deaths, 1930-1942 Inclusive
in the City of New York*

| Year | Deaths | Deaths Per 100,000 Population |
|------|--------|-------------------------------------|
| 1930 | 8,058 | 116.0 |
| 1931 | 9,245 | 132.2 |
| 1932 | 7,827 | 111.1 |
| 1933 | 7,686 | 108.2 |
| 1934 | 6,755 | 94.4 |
| 1935 | 6,385 | 88.6 |
| 1936 | 6,549 | 90.2 |
| 1937 | 6,504 | 89.0 |
| 1938 | 4,737 | 64.3 |
| 1939 | 4,234 | 57.1 |
| 1940 | 3,410 | 45.7 |
| 1941 | 3,383 | 45.0 |
| 1942 | 2,959 | 39.1 |

Source—February 1942 *Quarterly Bulletin* City of New York Department of Health

The effect on the annual death rate does not give an entirely valid expression of the changes in mortality wrought by the newer therapy, for account must be taken of any changes in incidence. In view of the fact that the incidence of pneumonia has increased since the introduction of the sulfa drugs the effect on mortality is even more striking than is indicated by the gross annual mortality rates.

The true measure of the benefit resulting from sulfonamide therapy must be evaluated by its effect on case fatality rates and not by gross mortality figures which are influenced by and take no account of changes in incidence. Analysis of the case fatality in the series here reported revealed a mortality of 20.8 per cent (± 1.5)* in the first period (1935 to 1937) and 3.9 per cent (± 0.5)* in the second period (1939 to June 1, 1942), indicating that a remarkable reduction in mortality has occurred since the introduction of sulfonamide medication. The case fatality of approximately 4 per cent is lower than the case fatality rates of 8 to 12 per cent reported in most series of hospitalized cases treated with sulfona-

* Standard Deviation

mides.^{6, 7} The present study, however, includes only cases of pneumonia between 15 and 65, and it is well known that mortality in this age group is less than at the extremes of life. Furthermore, a large percentage of these may not have been so seriously ill as to require hospitalization. Rosenthal, McCall, and Pratt recently reported a similar case fatality rate of 3.8 per cent in 132 cases treated in the home with sulfathiazole.⁸ The findings indicate that between the ages of 15 and 65 the case mortality rate in pneumonia is now of the order of 4 per cent. Stahle⁹ recently reported a case fatality rate of 6.82 per cent in an analysis of 6,321 cases with pneumonia between the ages of 13 and 60, who were treated with chemotherapy, and Plummer, et al.¹⁰ in a smaller series of cases under their observation reported a mortality of 3.4 per cent in patients between the ages of 30 and 50 who were treated with chemotherapy.

DURATION OF ILLNESS AND ECONOMIC ASPECTS

Clinically it is found that not only is the mortality favorably influenced by sulfonamides, but the course of the disease is greatly abbreviated. It is extremely rare to observe a classic crisis with modern treatment and most frequently fever subsides by rapid lysis within 36 to 48 hours. The period of hospitalization too has been greatly abbreviated. While pneumonia now responds rapidly to treatment in most cases, the total duration of disability remains not inconsiderable, and it is still several weeks before the average patient is ready to resume his activities.

The average duration of illness in terms of days away from work was 33 days in 1941, compared with an average work loss of 45 days in 1935. The modal or most frequent duration of illness in 1941 was 27 days compared with 38 days in 1935. The entire

period studied has as the average duration of non-fatal pneumonia illness 43 days in the first period (1935 to 1937) and 36 days in the second period (1939 to June, 1942). The shortening of illness is actually greater than would appear from these averages, for many previously fatal cases now survive to become illnesses of longer than average duration.

Illness is a more important cause of industrial absenteeism than any other factor, and respiratory tract diseases are responsible for more loss of time from work than all other illnesses combined. Pneumonia is relatively infrequent compared with other acute respiratory infections, such as colds and influenza, but since the average case results in approximately a month's loss of time from work, pneumonia becomes a factor of significance in itself. It is of interest to compute what savings have accrued to industry through the introduction of sulfa drugs.

Recent statistics indicate that there are approximately 52,000,000 gainfully employed persons in the United States.^{11, 12} Based on incidence and mortality rates of pneumonia established in the present study, it is calculated that the use of sulfa drugs in pneumonia is saving the lives of some 25,000 industrial workers annually and the considerable expense and time incident to replacing these workers in their specialized occupations. Had the incidence of pneumonia remained unchanged, the beneficial effect of the sulfa drugs in shortening the duration of illness would have resulted in a further annual saving of over 1,000,000 working days. However, since the incidence has increased the actual savings in working days actually is appreciably greater.

COMMENT

This study was undertaken to determine whether the widespread use of

sulfa drugs* has effected any change in public health aspects of pneumonia, such as prevalence, comparable with the striking changes observed clinically in the treatment of the individual case.

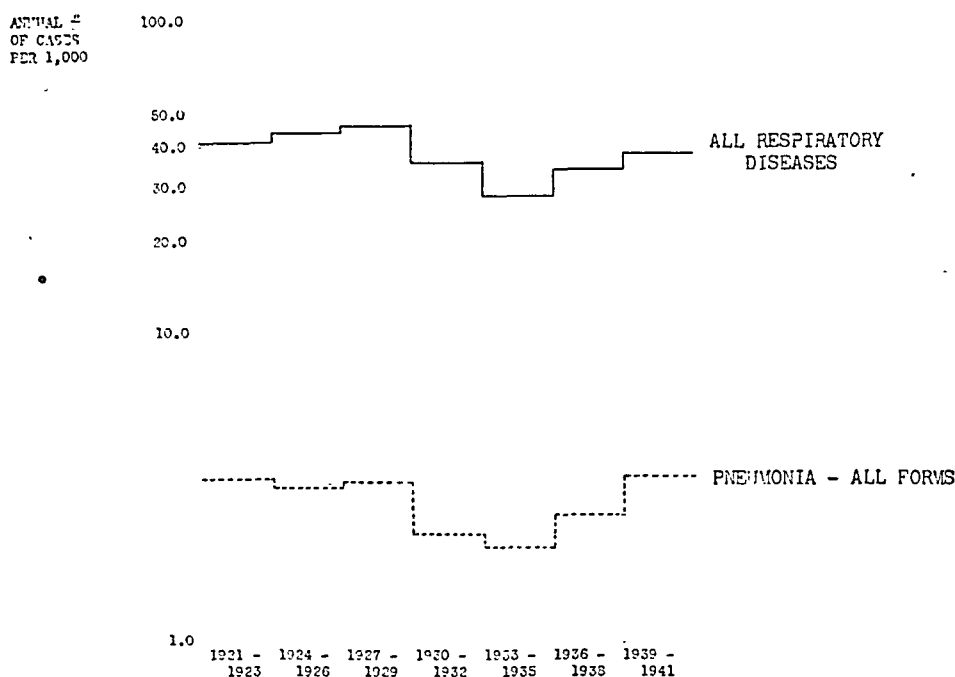
An increased frequency of pneumonia was not anticipated, and while not marked in degree, it is sufficiently definite to warrant analysis. The incidence of pneumonia in 1940 and 1941 was higher than in any year in the

certain other infectious diseases. It is well known that upper respiratory infections predispose to pneumonia and the high frequency of pneumonia immediately following the last war was undoubtedly due to the influenza pandemic at that time. The change in incidence of pneumonia from 1921 to 1938 paralleled very closely the yearly change in incidence of other respiratory diseases (Figure 3). However, in

FIGURE 3

RESPIRATORY DISEASES LASTING 8 CONSECUTIVE CALENDAR DAYS OR LONGER
TRIENNIAL AVERAGE FREQUENCY PER 1,000 MALES, 1921-1941

(LOGARITHMIC SCALE)



Source: PUBLIC HEALTH REPORTS

preceding decade, but was no greater than the frequency rate in the preceding decade from 1920 to 1930. It is possible that the increased prevalence in the past few years reflects a cyclical change in incidence, although it has not been shown that any definite periodic fluctuation occurs in pneumonia as in

the past few years since 1938 an increase in the incidence of pneumonia has occurred out of proportion to a much lesser increase in prevalence of other acute respiratory diseases. The current high pneumonia rate, therefore, is not following passively in the wake of other respiratory illnesses and must be attributed to some other cause.

The increase in the number of cases of pneumonia cannot be ascribed to any improvement in the diagnostic acumen.

* A recent survey indicates that sulfonamide medication is employed in over 85 per cent of fatal cases of pneumonia, and is probably used in an even higher percentage of recovered cases.²¹

In the case of coronary artery disease the tremendous increase in reported incidence undoubtedly has been due in large part if not entirely to improved methods of diagnosis such as the use of the electrocardiogram, but the signs of pneumonia have long been well known and it seems dubious whether x-rays have been employed as a diagnostic method to any considerably greater degree during the past few years.

Wartime living conditions may play a part in accounting for the increasing prevalence of pneumonia. The incidence of other infectious diseases, notably tuberculosis, has increased appreciably during the present war. It is quite likely that such factors as congestion in cities, inadequate housing, crowded transportation, long hours and irregular habits resulting from night shifts, inadequate medical attention, all may have contributed to a general increase in the prevalence of infectious diseases. The significance of crowding was revealed in the National Health Survey¹³ where it was found the pneumonia frequency rate was 6.7 for families with more than 1½ persons per room, as against 4.0 for families with 1 person or less per room. Benjamin, Rueggsegger, and Senior have emphasized the hazard of overcrowding,¹⁴ and the occurrence of cross-infection¹⁵ in pneumonia. During the first week of illness the risk to household contacts has been estimated to be sixty times greater than in the general population. In a recent study on the epidemiology of pneumonia,¹⁶ Smillie and Jewett emphasized the spread of pneumonia in a closed community, finding a rapid spread of type 14 pneumococcus. This study suggested "that a virulent strain of pneumococcus may enter a community, permeate it, invade many individuals, and linger for a considerable time without causing any apparent illness. Some untoward factor may

then enter the picture (such as an acute respiratory infection) which will lower the resistance of the carrier of the virulent pneumococcus strain to such a degree that the strain will invade the tissues of the body and produce a serious illness."

One may note that a definite upswing in the prevalence of pneumonia was apparent in 1940 before any great economic or social dislocation had been brought about by the war. The tremendously increased industrial activity in the United States during the past few years has drawn numbers of older people into industry, which has been all the more accentuated by the withdrawal of young men into the armed forces. Many employees of advanced years are reluctant to admit their true age when obtaining employment so that there must be an even greater percentage of industrial workers of advanced years than would be indicated in a statistical tabulation. The incidence of pneumonia rises gradually from approximately 2.5 per 1,000 annually at age 20, to 6 per 1,000 at age 60, the prevalence increasing very rapidly thereafter beyond the age of 60.¹³ The observed increased prevalence of pneumonia may be due in part to an increase in the average age of industrial workers. However, the average age of the employees investigated in the present study remained fairly constant over the period from 1937 to 1941.

One may speculate whether the use of sulfa drugs has had any specific effect, *per se*, on the frequency of pneumonia. This is unlikely for several investigators have shown that the antibody response in pneumonia is not significantly altered by sulfa therapy,¹⁷⁻²¹ nor has it been found that there are more carriers following pneumonia in sulfa treated cases.²²

During the past year an increased number of cases of atypical pneumonia

have been observed which have proved refractory to sulfonamide treatment. A virus etiology has been demonstrated in some cases, but it would be a serious error to conclude that a new disease has suddenly become widely prevalent, and that all cases of pneumonia which fail to respond in the usual manner to the sulfonamides are examples of virus pneumonia. It has been shown that pneumococci may acquire a resistance to sulfonamide during treatment and that such organisms remain sulfonamide-fast in succeeding generations.²³ The frequent failure of sulfonamide therapy observed during the past year may represent instances of pneumonia due to sulfonamide-fast organisms, and a diagnosis of "atypical" or virus pneumonia should not be made until every effort has been expended to demonstrate pneumococci in the sputum. The cases of pneumonia which form the basis for the present report include all types of pneumonia and if it is true, as some believe, that the prevalence of virus pneumonia has actually greatly increased, this may account for the observed increased frequency of pneumonia. Since the mortality rate of virus pneumonia is very low, the inclusion of these cases may be a factor contributing to the very low mortality of 4 per cent observed in the present series.

SUMMARY

A study was undertaken to ascertain whether sulfonamide therapy has had any effect on public health aspects of pneumonia comparable to the remarkable changes observed in treatment of individual cases. An analysis was made of pneumonia experience among large groups of industrial employees carrying group health and life insurance with the Equitable Life Assurance Society of the United States, and a comparison was made between the pre-sulfonamide years 1935-1937 and the period from January 1, 1939, to June 1, 1942.

Most striking was the reduction in the case fatality rate from an average of 20.8 per cent to 3.9 per cent in this short space of time. Significant too was a decrease in the total duration of illness from the modal (most frequent) period of 38 days in 1935 to 27 days in 1941. It is calculated that the advent of sulfonamide therapy has proved a boon to industry, saving the lives of some 25,000 workers annually. A further annual saving of over a million working days has resulted from shortening of the period of illness.

The incidence of pneumonia has increased from an average of 2.6 per 1,000 annually in the pre-sulfonamide period to 3.0 per 1,000. Possible reasons for the increased frequency of pneumonia are discussed. There is no evidence that sulfonamide therapy, *per se*, is responsible for the increased prevalence of pneumonia and other factors such as congestion in industrial areas incident to the war effort may be responsible. Since all types of pneumonia were included in the study it is possible that an increase in the number of cases of "atypical" or virus pneumonia may in part be responsible for the observed increase in the frequency of pneumonia.

NOTE: The authors acknowledge with thanks the assistance of Miss Ruth Unverzagt in assembling the statistical data.

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Industrial Eye Health Problems*

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IN a war program industry is geared to top capacity. It must of necessity, therefore, reduce waste, not only of time, equipment, machinery and raw materials, but also of man power and skills. It is useless and unfair to ask any employee to improve his work and reduce his mistakes if he is not able to see the work, or does not have the necessary visual skill for his specific job. An understanding of the manifold elements that make for visual skill has until recently been overlooked. The protective measures needed to cut down eye hazards, while understood, have been inadequately applied.

Especially during a period of stress such as the present it is necessary to focus attention on visual conservation in industry. There are two main problems which are of concern to both management and employees.

The first concerns the need for visual *admission* standards. In many industries where visual requirements have been set up, a single arbitrary specification has been used, based only on central visual acuity for distance. Instead, one should recognize the eyes as a binocular unit with multiple functions, each of which has definite bearing upon the individual's ability to meet the demands of a specific job. This, in turn, permits a simple classification of jobs, grouping together those having approximately the same types of visual work and safety requirements. Already there is some basis for such grouping, but

further investigation is needed to develop a placement program that is adequate to fit any and all types of industry. Selection will need to be concerned not only with general aptitudes and physical health, work skills, and craft training, but also with visual aptitudes.

The second problem involves the use of a similar visual testing procedure in conducting a *survey* of employees within a given industry. Here it is important to apply the same yardstick of standards of visual functions, based on the needs of the job, as that used in hiring new applicants. Thus employees already on the pay roll, who fail to meet the visual requirements for their specific job, can be made to qualify for the special visual demands of that job, or can be transferred where necessary.

Industry is already engaged in a five to ten year stretch of intensified activity no matter what the international scenshifts may be. Perceptual abilities of all kinds are the first essential with which to meet this immense effort. Among these abilities, excellence of visual performance ranks first.

EYE PROTECTION

The question of proper handling of eye injuries is necessarily in the hands of the ophthalmologist consulted. The constantly changing processes in industry mean new uses of gases, fumes, chemicals, glares, and materials whose possible toxic effect on the eye demands persistent study by the ophthalmologist. The engineer too must play his part

* Read before the Industrial Hygiene Section of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 29, 1942.

by revision of processes to reduce hazards and by developing devices and methods for the control of such hazards. Goggles for protection from flying objects, from gases, from the chemicals (liquid or solid), from light, etc., are constantly being improved. Samples of such personal protective equipment designed for every purpose are displayed at each safety conference and are available to any safety director in either a large or a small plant. Special goggles for women are being developed with reference to the weight of the goggles and the cosmetic aspects. The setting up of a goggles program includes the study of the type of goggle and of the economics involved. An "all out" program which provides goggles for everyone, with industry paying the full bill is, generally speaking, the best. Special economic problems arise in providing goggles which correct refractive errors. Some employers may feel that the employee who needs glasses to see in private life should have a greater share in financing the goggles where the lens prescription is incorporated. Those industrial processes that involve frequent replacement of the lenses or goggles, as in excessive pitting, have other special economic angles. All of these variables can be worked out with fairness both to management and to the employee, where there is good will and a desire to have a fully satisfactory arrangement. Good quality, standard tested merchandise is assumed. Fitting of frames, temple pieces, measurement of interpupillary distance, etc., are essential for ordinary plano goggles as well as corrected-vision protection. An ambulatory repair service has proved excellent in many large plants. And, finally, the proper educational background work and the sharing by labor and management in setting up specific plant methods, makes an eye protection program generally practical and possible.

VISUAL TESTING IN INDUSTRY

On the basis of our recent visual survey of over 16,000 workers in ten or more types of industry, presented in detail to the American Academy of Ophthalmology and Otolaryngology, and an intensive study of the visual requirements of some additional 10,000 workers for specific jobs, we could come to only one conclusion—that to evaluate an individual's ability to do a certain job safely and efficiently as far as his vision is concerned, involves much more than a mere knowledge of his central visual acuity for distance.

Only when he has before him all of these data can the admission examiner decide whether a man is fitted to be a craneman or machinist, or whether a girl can be an efficient inspector or comptometer operator. One of the most striking revelations of this survey was the extraordinary correlation between accuracy and efficiency of work on the one hand, and perfection of visual performance on the other. These relationships show conclusively that much more than visual acuity is involved in the evaluation of "eyes for the job" and that any other criteria are obsolete.

Visual testing falls into three main categories—(a) preemployment, (b) periodic rechecks of special groups, and (c) plant surveys. For the duration of the war especially, there need be few or no rejections of applicants for jobs. However, for this very reason there must be more accurate and practical admission records in order that placement personnel can quickly consider visual safety and visual skill of applicants. More than ever we want to conserve eyes, man power and high production efficiency. In certain dangerous jobs especially dependent on full visual acuity and binocular coordination, periodic rechecks are needed to discover changes in the eyes. For example, crane operators and drivers of

automotive vehicles and machines are as much in need of periodic visual appraisal as are aeroplane pilots, for whom such reappraisals are already accepted practice. There are certain exceedingly important and vital jobs, such as the reading of precision instruments like micrometers and gauges, setting of precision lathes, inspecting or reading of blue prints, where accuracy and production efficiency depend also on the changing human eye. For employees in all of these and many more types of work, rechecks are indicated at stated intervals. Some industries which now have been made a part of the vital war effort have never had any sort of visual testing program. Critical divisions and sections of these plants will profit tremendously by a visual survey geared to meet their individual needs. Probably not until after the war will a visual testing program become possible as an inclusive entity.

The basic visual data industry needs recorded for each employee include:

1. Distant and near central visual acuity without glasses
2. Distant and near central visual acuity with glasses
3. Muscle unbalances (phorias) for distance and near
4. Depth perception
5. Color appreciation levels
6. Near vision test, depending on individual and job

Special emphasis on near vision tests is always indicated where an employee is 40 years and over. But for applicants for all jobs requiring exact visual skills at a working distance within 16 inches there should be added a standardized test for near point at convergence, and near point of accommodation and a refraction for work distance with the lenses prescribed for that specific distance. This statement cannot be overemphasized as industry draws to its ranks more employees in the upper age brackets and more indi-

viduals previously unused to close work. The ordinary street-wear bifocals do not necessarily meet the work needs as related to distance or types of spectacles indicated for occupational use.

The correlation between degree of perfection of visual skills and production level has until very recently been largely overlooked in this country.* Some work had been done in England but a dramatic and brilliant statistical analysis of this and many other hitherto unstudied phases of the problem of visual factors in efficiency was made possible through our research program by the coöperation of the Department of Applied Psychology at Purdue University. This breakdown of survey data into almost a million correlations will be an epoch-making study. This joint effort by industry, psychology, and ophthalmology seeks to validate technics, validate the needs and proposed instrumentation, establish a scientific yet practical interpretation of visual defects from the standpoint of occupational needs, and to lay a solid foundation for the contemplated program of remedial recommendations both before and after hiring. All the work to date points to a direct and consistent relationship between maximum production, maximum accuracy, and the visual perception components.

Medicine may now therefore directly conserve not only the health of an individual's eyes, but can help to increase the production schedules for management and raise the income of the employees. The various rehabilitation problems involved in a war program are becoming more and more important. Among these corrective problems are: training of adult individuals who lack coördination of the eye muscles to develop the needed binocular skills; proper refraction for job distance and

* Tiffin, Joseph, Ph.D. *Industrial Psychology*. Prentice-Hall, 1942, pp. 124-184.

prescription of glasses in relation to that job; detection and care of changes or disease in an employee's eyes as revealed in the periodic testing; equipping each individual so that he is able to meet the visual requirements of his assigned job. Advances and progress in the field of industrial ophthalmology, in eye protection equipment, in the analysis of visual aptitudes, in the classification of jobs as related to visual skills and, especially, the unexpected responsibilities of ocular rehabilitation in a country at war, have been so rapid that constant reference to current scientific literature is indicated.

The contribution of ophthalmology to the war program therefore includes the provision of reliable protection to the eyes of workers, with the aim of maximum production and minimum waste.

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Tetanus Toxoid and Its Use for Active Immunization*

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THIS study records the antitoxin response to tetanus toxoid in young adults. The first part of the study deals with the results obtained following two doses of toxoid as compared with three doses of an identical antigen. The second part has to do with the response to three doses of a combined antigen, made up of typhoid, paratyphoid A and B vaccine, suspended in tetanus toxoid.

Preparation of toxoid—In the preparation of the toxoid used in these studies, the following details are relevant. Upon the outbreak of war large quantities of tetanus toxin were prepared in anticipation of the requirements of toxoid for the armed forces. The broth used for this purpose was a veal infusion base with 1.5 per cent Witte's peptone added. With this medium the potency of the toxin obtained varied between 20,000 and 150,000 m.l.d. (guinea pig) per ml. Detoxification was carried out in the usual manner with formalin and storage at 37° C. The comparison of the antitoxin response to two doses and to three doses of antigen was based upon the results obtained with toxoid thus prepared. For convenience

of expression and reference, toxoid made in that manner is designated, Toxoid A. Experience with this toxoid, used under field conditions, showed that reactions of an anaphylactic character were occasionally encountered.¹ In consequence of this, the use of Witte's peptone in the medium for the preparation of toxin was discontinued in the spring of 1940, and hog stomach autolysate plus veal infusion was substituted, Toxoid B. Later, the medium used for the production of toxin was one adopted for the purpose by E. M. Taylor,² the basis of which was half veal infusion and half hog stomach autolysate treated with calcium chloride in order to reduce the iron content to a fixed level. A small amount of nicotinic acid was added, and the pH set at about 7.0. The strain of *Clostridium tetani* used throughout for the production of toxin was obtained in 1929 from the New York State Health Department, and used in these laboratories continuously since that time. Incubation was carried out at between 35° C. and 36° C. for 10 or 11 days. The yield of toxin with this medium has been satisfactory. During a period of 18 months, for example, of 130 lots of toxin made, 72 were between 100,000 to 220,000 m.l.d. per ml. Twenty lots of the 130 had a value of less than 30,000 and were discarded. Toxoid made in this manner with Taylor broth,

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Toxoid C, was combined with typhoid, para A and para B vaccine. The broth used for tetanus Toxoid B and tetanus Toxoid C is basically very similar to that used by Ramon for his combined antigen employed for many years in the French armed forces, and without the occurrence of reactions of an anaphylactic character. Similarly no such reactions have been reported following the extensive use of Toxoid B for a period of approximately 1 year, and of Toxoid C for 2 years. The antigenicity of the toxoid was tested either by the method of flocculation, antitoxin response in guinea pigs, or combining power, or a combination of these methods.

PART I

Comparison of the antitoxin response to two and three doses of tetanus toxoid—This experiment was carried out in two groups of volunteers to determine the comparative antitoxin response to an identical antigen, Toxoid A, used in two doses and three doses of 1 ml. given during the same total elapsed time. The intervals shown in Table 1 were approximately 6 weeks be-

For convenience, the results of the titration of the 61 blood samples of the two dose group, and the 54 in the three dose group may be considered as falling into two categories. Thus, in the two dose group, 82 per cent of persons have at least 0.01 unit of antitoxin, in contrast to 92 per cent in the three dose group. Taking 0.1 unit as a basis of comparison, the results in the two groups are more strikingly contrasted; 23 and 68 per cent respectively. On the basis of this study, which was carried out late in 1939, it was felt justified to recommend without hesitation that three doses of toxoid be used in place of two, and given within the elapsed time of 6 weeks. As a matter of fact, since three doses of typhoid para A and para B vaccine were recommended for the armed forces it seemed convenient and logical for administrative purposes to combine tetanus toxoid with the typhoid antigen (T.A.B.T.)* as had been advocated by Ramon, and had been the current practice in the French armed forces since 1936.³ This combined antigen was introduced for use in the Canadian armed forces in the spring of 1941.

TABLE 1
Units of Tetanus Antitoxin per ml. of Blood Serum
70 Days After 2 or 3 Doses of Tetanus Toxoid A
Units Antitoxin 70 Days after Last Injection

| Number of Doses of Tetanus Toxoid A | Number of Subjects | | | | | | Per cent | |
|-------------------------------------|--------------------|--------|-----------------|---------------|--------------|-----|----------|-------|
| | | <0.001 | 0.001- <0.01 | 0.01- <0.1 | 0.1- <1.0 | 1.0 | ≥0.1 | ≥0.01 |
| 2 * | 61 | 2 | 9 | 36 | 14 | 0 | 23 | 82 |
| 3 † | 54 | 0 | 4 | 13 | 36 | 1 | 68 | 92 |

* 39 days between doses

† 28 and 11 days respectively between doses

tween the first and second doses in the two dose group, and in the three dose group 1 month between the first and second and 2 weeks between the second and third doses. A blood sample was obtained 70 days after the final dose in each group. The antitoxin titrations of the serum were carried out at various levels, in mice.

Antitoxin response to a recall dose—It was urgent to gain experience of the effectiveness of the recall dose ("dose de rapell," of Ramon) for tetanus toxoid. The coöperation of 20 persons

* 750 million *Bacillus typhosus*, 250 million *B. paratyphosus* A, and 250 million *B. paratyphosus* B, per ml. of tetanus toxoid, containing about 10 Lf per ml.

was obtained (8 in the two dose group, and 12 in the three dose group) to take 0.1 ml. of Toxoid A, 70 days after the last dose had been given. The small secondary stimulus was chosen primarily to determine whether by a small subcutaneous dose one could detect the persons who had become highly sensitive to Witte's peptone toxoid, Toxoid A, through previous inoculations. If no reaction were obtained with this small dose within, say, $\frac{1}{2}$ hour, the full dose could then, if desired, be administered with a greater feeling of safety. In the group of 20 volunteers no evidence of sensitivity was encountered. This is not surprising, considering the small size of the group and the known infrequency of reactions, following Toxoid A preparations. It is obvious that the small dose used in our study weighted the odds against the antigen. If, under these exacting conditions, the response in antitoxin were good, one would perhaps be justified in inferring that a larger dose would not evoke a lesser response and, indeed, probably a better one. That such is the case is borne out later in this study. Because of the urgency of the situation, it was also thought justifiable to shorten the time between the primary series of in-

oculations and the recall dose to 70 days, and to measure the response in antitoxin within 9 days. These factors also tend to weight the odds against the effectiveness of the antigen. Thus by imposing the very exacting and unfavorable conditions under which the antigen was used, the results, if good, could be accepted with some degree of confidence, and serve as a firm basis for formulating recommendations as to the dosage of tetanus toxoid. It will be seen from Table 2 that all but 2 in the three dose group, and 1 in the two dose group, showed an increase in antitoxin within 9 days. Thus, in spite of the limitations imposed upon the antigen by the conditions of the experiment, 85 per cent of 20 persons showed an increase in antitoxin following the small secondary stimulus of 0.1 ml. There is much evidence that the antigen now supplied has much higher antigenic potency, hence the results of this experiment are particularly encouraging. The tetanus toxoid now used is made from toxin pooled to contain 100,000 m.l.d per ml. as contrasted with the early lots of toxin of 40,000 m.l.d. per ml.

The effectiveness of a small stimulus, 70 days after the primary inoculation,

TABLE 2

Units of Tetanus Antitoxin per ml. of Blood Serum

Immediately Before and 9 Days After Recall Dose of 0.1 ml. Tetanus Toxoid A

| Units Immediately before Recall Dose | Number of Doses | Number of Subjects | Units Antitoxin 9 Days after Recall Dose | | | |
|--|-----------------------|--------------------------|--|--------------|--------------|------------|
| | | | 0.05- $<$ 0.1 | 0.1- $<$ 0.4 | 0.4- $<$ 0.8 | \geq 0.8 |
| -0.01 | Two * | 1 | 1 | .. | .. | .. |
| 0.01- $<$ 0.1 | " | 5 | .. | 5 | .. | .. |
| 0.1 - $<$ 0.4 | " | 2 | .. | 1 | 1 | .. |
| 0.01- $<$ 0.1 | Three † | 1 | .. | 1 | .. | .. |
| -0.1 | " | 1 | .. | 1 | .. | .. |
| 0.1 - $<$ 0.4 | " | 9 | .. | 2 | 7 | .. |
| 0.4 - $<$ 0.8 | " | 1 | .. | .. | .. | 1 |
| Total | | 20 | 1 | 10 | 8 | 1 |

* 39 days between doses

† 28 and 11 days respectively between doses

Recall dose 70 days after last dose

85 per cent of the 20 subjects showed an increase in antitoxin 9 days after recall dose.

was also explored in a group of 38 persons, 25 in the two dose group and 13 in the three dose group, 1 month after the secondary stimulus of 0.1 ml. Toxoid A. The response after 30 days was essentially the same as after 9 days (Table 2), that is to say, 85 per cent showed an increase within 9 days and 84 per cent an increase within 30 days.

PART II

Response to three doses of T.A.B.T.

—Before the combined antigen, which is officially designated as T.A.B.T., was recommended for use in the armed forces it was urgently required to carry out a trial of the antigen under field conditions. This trial was commenced in July, 1940, on a small group, from 79 of whom we were able to obtain blood samples 8 weeks after the third dose. Three doses of 1 ml. of the combined antigen, T.A.B.T., were given with intervals of 3 weeks between doses. It will be seen from Table 3 that 99

TABLE 3

Units of Tetanus Antitoxin per ml. of Blood Serum, 56 Days After Third Dose of T.A.B.T.

| <i>Units Antitoxin per ml. of Serum</i> | <i>Number of Subjects</i> | <i>Per cent of Subjects</i> | |
|---|---------------------------|-----------------------------|---------|
| <0.001 | 1 | 1.3 | } 12.7% |
| 0.02-0.1 | 9 | 11.4 | |
| 0.1-0.5 | 54 | 68.3 | } 87.3% |
| ≥0.5 | 15 | 19.0 | |
| Total | 79 | 100.0 | |

per cent of 79 persons had at least 0.02 unit of antitoxin, and 87 per cent had at least 0.1. This is a very satisfactory result and gives one a high degree of confidence in the effectiveness of tetanus toxoid as an antigen. Based chiefly on theoretical evidence, supported by laboratory experiment, 0.01 unit has been suggested by certain workers⁴ as the level required to establish clinical immunity. On this basis,

the fact that 99 per cent of 79 persons had 0.02 unit per ml. of serum leaves little to be desired. However, it should be emphasized, though it is perhaps not surprising, that one individual did not respond with any detectable amount of antitoxin (<0.001 unit).

Although the figures are not large and the conditions for a critical test are wanting, since the identical antigen was not used in the comparative tests, the result of the trial with T.A.B.T., suggests that the combined antigen may be more effective than without the added typhoid element (see MacLean and Holt⁵). It happened that the initial m.l.d. (40,000) of the toxin was the same in each of the particular lots of Toxoid A and Toxoid C used for the results shown in Table 1 and 3. In comparing the two groups, it will be noted that 68 per cent of 54 persons (three dose group) had at least 0.1 unit of antitoxin as contrasted with 87 per cent of 79 persons, following three doses of T.A.B.T. The difference between the results in the two groups, one without, the other with added bacterial vaccine, is of statistical significance. It is, of course, not to be inferred that the initial m.l.d. of the toxin is the sole determining or necessarily the most important factor in the antigenicity of the toxoid made therefrom.

Response to a recall dose of T.A.B.T.

—An opportunity arose to obtain information on the rapidity and degree of antitoxin response to a secondary stimulus using T.A.B.T. 0.5 ml. at approximately 1 year after the primary course of inoculations. The antigen used in the initial course was Toxoid A or Toxoid B (Table 4a), given in two doses, generally at 6 weeks interval, or three doses of T.A.B.T. given at intervals of 3 weeks (Table 4b). This latter antigen was introduced in the Canadian armed forces in the spring of 1941.

It must be emphasized that the groups under investigation are not en-

TABLES 4A AND 4B

*Units of Tetanus Antitoxin per ml. of Blood Serum After
First Recall Dose of 0.5 ml. T.A.B.T.*

| Table 4A Primary Inoculation Toxoid A or B Units of Antitoxin Just Before Recall Dose | Number of Subjects | Units Antitoxin per ml. Serum after First Recall Dose | | | | | | | | | | |
|--|--------------------------|---|--------------|------------|-----------|-----------|----------|---------|---------|---------|---------|----|
| | | <0.001 | $0.001-0.01$ | $0.01-0.1$ | $0.1-1.0$ | $1.0-5.0$ | $5.0-10$ | $10-20$ | $20-30$ | $30-40$ | $50-60$ | 70 |
| <0.001 | 21 | 3 | 1 | 3 | 11 | 3 | .. | .. | .. | .. | .. | .. |
| $0.001-0.01$ | 21 | .. | .. | 1 | 2 | 16 | 2 | .. | .. | .. | .. | .. |
| $0.01-0.10$ | 39 | .. | .. | .. | 6 | 25 | 1 | 4 | 2 | .. | .. | 1 |
| $0.10-1.0$ | 20 | .. | .. | .. | .. | 13 | 1 | 5 | .. | 1 | .. | .. |
| $1.0-5.0$ | 4 | .. | .. | .. | .. | 1 | .. | 2 | .. | .. | 1 | .. |
| Total | 105 | 3 | 1 | 4 | 19 | 58 | 4 | 11 | 2 | 1 | 1 | 1 |

Table 4B
Primary Inoculation—T.A.B.T.
Titrations not done before 1st
Recall Dose

| | | | | | | | | | | | |
|----|---|---|---|---|----|---|----|---|---|---|----|
| 63 | 1 | 2 | 1 | 1 | 13 | 9 | 33 | 1 | 1 | 1 | .. |
|----|---|---|---|---|----|---|----|---|---|---|----|

1st Recall dose given 12-18 months after last dose of primary series of inoculations

Table 4A—Primary inoculation = 2 doses of Toxoid A or B—blood drawn immediately before and 10-14 days after 1st recall dose

Table 4B—Primary inoculation = 3 doses of T.A.B.T.—blood drawn from 10 days to 9 months after 1st recall dose

tirely satisfactory from the point of view of the accuracy of history of primary inoculations. For example, of 105 persons (Table 4a), in 16 instances no data were obtained as to previous history, except that the subjects had been required to have their recall dose. Under the circumstances of the mobility of troops it was impossible to obtain more accurate data. In Table 4a, are shown the results of a group given initially Toxoid A or B, two doses of 1 ml. with an interval of 6 weeks. Of 105 subjects, 92 per cent showed at least 0.1 unit per ml. within 10 to 14 days after the first recall dose of 0.5 ml. of T.A.B.T. Actually 74 per cent of the whole group had more than 1 unit, 15 per cent more than 10 units, and 1 individual, 70 units. As is well established in the response to diphtheria toxoid, the individual variation is very great. It is striking that a small group responded either not at all, or very poorly. Fortunately this is a small group; 3 only showing no response within the limits of the test (<0.001 unit). It may be significant that the 3 persons who showed no measurable

response (<0.001 unit) to the recall dose had similarly no measurable antitoxin at the time the stimulus was given. One of these individuals is recorded as having had only one dose, approximately 2 years prior to the recall dose. Of the remaining 2, 1 had an interval of 2 months between his first and second dose, the other had 11 months between his first and second dose. However, one does not wish to emphasize these anomalies of inoculation as being the underlying cause for the poor response. The histories are not completely reliable and there are other similar anomalies in the group with good response. For example, there are, among the 105 subjects, 10 who are recorded as having had only one dose, but who as a group showed a satisfactory response following the recall dose. Every effort has been made to verify the histories of those who did not respond, and we have no evidence that they did not receive the doses as recorded.

It may be noted that, in general, the higher the level of antitoxin at the time of the secondary stimulus, the greater

the antitoxin response. For example, all those with 0.01 unit of antitoxin or more at the time of the recall dose, had at least 0.1 unit after the recall dose; indeed, the great majority had at least 1 unit. As a matter of fact, of those having <0.01 unit before the recall dose, none showed as much as 10 units after the recall dose, whereas, of those having at least 0.01 or more initially, 15 per cent had 10 or more units.

Table 4b shows the results obtained in a group similar to that shown in Table 4a, except that the initial series of injections was T.A.B.T., and no titrations were made upon the sera previous to the recall dose. The blood samples were not obtained strictly within 2 weeks, as is the case of the subjects of Table 4a—most of them being drawn within 2 months, and 2 at 9 months. It appears that, on the whole, the response to the recall dose following the initial injections of T.A.B.T. is better than that following two doses of Toxoid A or B. Thus 92 per cent of 63 persons had at least 1 unit of antitoxin per ml., in contrast to 74 per cent of 105 subjects of Table 4a. This difference is statistically significant. It should be emphasized that one person failed to respond with any detectable amount of antitoxin. Thus,

in a total of 168 persons (Tables 4a and 4b) 4 (2 per cent), did not respond to the recall dose, and 3 others responded poorly (<0.01 unit). Boyd and MacLennan⁶ have mentioned the possibility of lack of response being overcome by a recall dose of toxoid in referring to the development of tetanus in 5 inoculated men. Our results show that of 21 persons (Table 4a) who had no detectable antitoxin 1 year after the primary injections, 18 responded to a recall dose. It seems clear that the majority of persons, even though they have no detectable antitoxin, do respond to a recall dose, but some do not.

Response to a second recall dose of T.A.B.T.—We were fortunate in being able to obtain blood samples from 31 persons who had had two recall doses of 0.5 ml. of T.A.B.T. at an interval of approximately 1 year. Blood was drawn at the time of the second recall dose and about 10 days later. The results are presented in Table 5a. It is of interest to contrast these results with those shown in Table 4a. In the latter table, 42 (40 per cent) of 105 persons had less than 0.01 unit per ml. of serum before receiving a recall dose, whereas all in Table 5a had at least 0.01 unit before receiving the second recall dose.

TABLES 5A AND 5B

*Units of Tetanus Antitoxin per ml. of Blood Serum After
First or Second Recall Dose of 0.5 ml. T.A.B.T.*

| Table 5A Units of Antitoxin 1 Year after 1st Recall Dose | Number of Subjects | Units Antitoxin per ml. Serum after 2nd Recall Dose | | | |
|---|--------------------------|--|-----------|----------|-----------|
| | | 0.1- <1.0 | 1.0- <5 | 5- <10 | ≥ 10 |
| 0.01- <0.05 | 8 | 3 | 5 | .. | .. |
| 0.05- <0.1 | 2 | 1 | 1 | .. | .. |
| 0.10- <1.0 | 16 | 3 | 11 | 1 | 1 |
| 1.0- <5.0 | 5 | .. | 1 | 2 | 2 |
| Total | 31 | 7 | 18 | 3 | 3 |

| Table 5B Titration Not Done before 2nd Recall Dose | | | | | |
|---|----|---|----|----|---|
| | 36 | 3 | 13 | 12 | 8 |

Second recall dose given approximately 1 year after 1st recall dose

Table 5A—Blood drawn immediately before and from 10 to 14 days after 2nd recall dose

Table 5B—Blood drawn from 10 days to 17 months after 2nd recall dose

As might be anticipated, the level of antitoxin is, in general, much higher 1 year after the first recall dose than 1 year after the primary series of inoculations. In so far as the response to the second recall dose is concerned, only 1 of the persons in Table 5a had a level of antitoxin below 0.5 unit, whereas 8 per cent of 105 persons (Table 4a) had less than 0.1 unit. Table 5b shows the results of titrations obtained from a group similar to that in Table 5a, except that no blood samples were obtained previous to the recall dose, and that the samples were not obtained strictly within the 2 weeks time. All of these 36 sera showed at least 0.1 unit per ml. Thus, each of the 67 sera comprising Tables 5a and 5b had at least 0.1 unit per ml. after the second annual recall dose.

Although the numbers are not large, it may be of significance that, before the first recall dose was given, 20 per cent of persons shown in Table 4a had less than 0.001 unit per ml., and 20 per cent of persons, in addition, less than 0.01 unit per ml., after a primary series of inoculations 1 year previously. This is in striking contrast to the results presented in Table 5a, in which it is shown that all had at least 0.01 unit 1 year after the first recall dose, that is to say, 2 years after the primary inoculations. There seems thus no doubt that the level of antitoxin is higher a year after the recall dose than a year after the primary series of injections.

In view of these results and based upon the good and prompt response to a small dose of toxoid given 70 days after the primary injections (Table 2), we suggest that the interval between the primary three inoculations of T.A.B.T. and the first recall dose be not less than 3 and not more than 6 months, and the second recall dose be given 1 year later. This does not, of course, preclude the giving of toxoid at the time of the infliction of a wound whenever this

should occur. Modification of this schedule may be made in order that the recall dose coincide as nearly as is practicable with the entry of troops into the combat zone.

In general, it may be assumed that the longer the interval between the primary series of injections and the recall dose the better. However, the shortening of the interval between the primary series and the first recall dose (4th dose) would seem from our study to offer certain distinct advantages. The antitoxin content would reach higher levels sooner, and be longer maintained, and the disturbingly low levels found 1 year after the primary series (Table 4a) would not obtain. Further, the second recall dose which in our studies has been shown to be very effective, could be given 15 to 18 months after the primary series in place of 24 months as is the current practice.

SUMMARY

By the use of a medium of veal infusion and hog stomach autolysate, tetanus toxin of high titer has been obtained. Following the use of toxoid made therefrom no reactions of an anaphylactic character have been reported.

By comparing the effectiveness of an identical tetanus toxoid, given to two groups in the same period, namely 6 weeks, our results show that the response in antitoxin in persons given three doses of tetanus toxoid is better than in persons given two doses.

Represented numerically, 68 per cent of 54 persons in the three dose group had at least 0.1 unit of antitoxin per ml. of serum 70 days after the last dose of tetanus toxoid, as compared with 23 per cent of 61 in the two dose group.

Under conditions which weighted the odds against the antigen, a small (0.1 ml.) secondary stimulus given 10 weeks after the primary series of inoculations caused 85 per cent of 20 persons to show an increase in antitoxin titer within 9 days.

A combined antigen of tetanus toxoid with typhoid vaccine (T.A.B.T.) given in three 1 ml. doses, 3 weeks apart, stimulated the production of at least 0.02 unit of antitoxin in 99 per cent of 79 persons, and at least 0.1 unit in 87 per cent.

Although the conditions for a critical comparison are lacking, since the identical antigen was not used in the two groups compared, the results suggest that tetanus toxoid with the typhoid element added (T.A.B.T.) is more effective than without.

Under field conditions the effectiveness of a recall dose of 0.5 ml. of T.A.B.T. was explored. Of 168 persons, 92 per cent had at least 0.1 unit of antitoxin per ml. of serum following the first recall dose.

In general, the antitoxin response to a recall dose is less in persons with low levels of antitoxin than in persons with relatively higher levels.

In general, the levels of antitoxin are distinctly higher in persons 1 year after a recall dose than 1 year after the primary inoculations.

From 10 days to 17 months after a second recall dose, given 1 year after the first recall dose, all of 67 persons had at least 0.1 unit per ml. of serum.

The recommendation is put forward that the first recall dose of T.A.B.T. (4th dose) be given not less than 3, and not more than 6 months after the primary series of injections. Modification of this schedule may be advisable in order that a recall dose coincide with the entry of troops into the combat zone

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Use of Current Birth Certificates in Planning a Maternal and Child Health Program*

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THE birth certificate contains a wide variety of information directly applicable to maternal and child health problems, and therefore can be used to good advantage in planning a maternal and child health program.

We shall discuss the information from the birth certificate according to (A) Data available without machine tabulation; (B) Data available with the use of machine tabulation, according to the following outline:

- A. Data available without machine tabulation
 - 1. Number of births according to residence of mother
 - 2. Number of births according to town of occurrence
- B. Data available by use of machine tabulation
 - 1. Number of births according to hospital where birth occurred
 - 2. Residence of mother according to hospital where birth occurred
 - 3. Blood test according to hospital where birth occurred
 - 4. Occupation of father according to hospital where birth occurred
 - 5. Occupation of mother
 - 6. Length of stay in community according to:
 - a. Time of blood test
 - b. Order of birth

The text of this paper demonstrates how information from the birth certificate can be used in planning such basic maternal and child health services as prenatal care, care at the time of delivery, postpartum care of the mother, and care of the infant.

Connecticut can be described as a compact industrial state of 1,709,242 population according to the 1940 census. The basic unit for the administration of local government and local health work is the town. There are 169 in all, of which Hartford is the largest, with a population of 166,267, and Union the smallest, with a population of 234. There are 24 towns with a population of over 10,000. During the period January 1 to July 1, 1942, there were 15,878 births reported. For this same period there were 1,170 maternity beds in 43 licensed maternity hospitals.

A record of the number of births is kept on a current month to month basis in Connecticut according to the residence of the mother and the place of occurrence. These records are open for inspection and analysis to all bureaus of the State Department of Health as soon as the birth certificate is received and recorded. If the information is summarized every 6 months, trends can be seen in time to plan necessary health services.

* Based on a paper presented at a Joint Session of the Vital Statistics and Maternal and Child Health Sections of the American Public Health Association at the Seventy-first Annual Meeting in St. Louis, Mo., October 27, 1942.

A. DATA AVAILABLE WITHOUT MACHINE TABULATION

1. An application of the use of the data according to the residence of the mother appears in Figure 1. Here is shown the location of those towns that have experienced a 50 per cent or more increase in resident births during the first 6 months of 1942, compared with the first 6 months of 1940. These towns have been correlated with towns considered to have inadequate nursing service. Nursing service was considered inadequate if, according to the records of the Bureau of Public Health Nursing, there was less than 1 public health nurse per 3,000 population. The director of the Bureau of Public Health Nursing, upon seeing this map, immediately saw areas in which the information could be applied to the educational and promotional public health nursing program.

By a similar treatment of the data on births, the existing and potential problems relating to medical services can be graphically pointed out. At a time when physicians are being withdrawn for military service, maps showing towns with an increased birth rate as well as an increased population due to war industries will be useful in determining which towns require more medical personnel for civilian needs. Persons directing a maternal and child health program will find such information useful in determining need for prenatal clinics, well child conferences, etc.

2. It was stated above that the birth certificates are recorded currently by town of occurrence in Connecticut, and that this information is readily available to establish trends for comparison between local health units, or with the state as a whole.

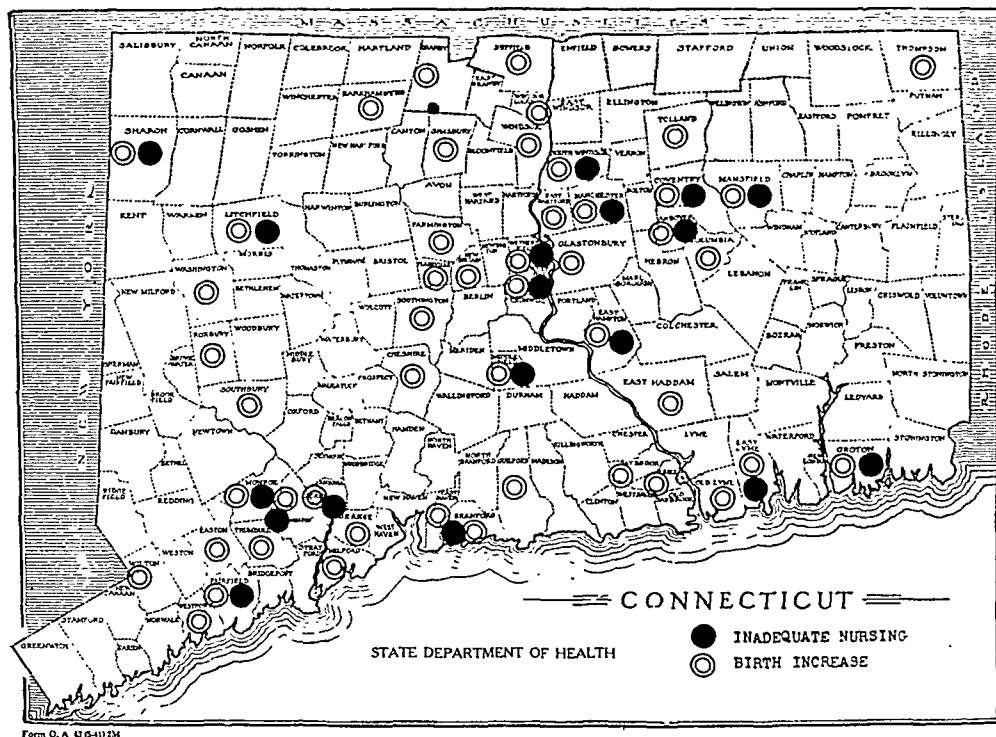


FIGURE 1—Inadequate nursing service in towns having a 50 per cent birth increase between January-June, 1940, and January-June, 1942

B. DATA AVAILABLE BY USE OF MACHINE
TABULATION

1. It will be possible to open a much wider field of investigation by sorting and tabulating the births on a hospital and home delivery basis. When the number of maternity beds for which a hospital is licensed is known, knowledge of the number of births that occurred in a particular hospital makes it a simple task to compute the maximum number of postpartum days which that hospital can carry its maternity patients at an accepted occupancy rate. We have used a 75 per cent occupancy rate for all hospitals and hereafter shall refer to this maximum number of postpartum days that a hospital can carry its patients as a "theoretical maternity stay." The formula for computing the theoretical maternity stay is as follows:

Theoretical maternity stay =
$$\frac{\text{Number licensed beds} \times \text{occupancy rate} \times \text{number survey days}^*}{\text{number births during survey}}$$

* The period of our survey is 6 months, or 180 days.

Table 1 shows a selected group of hospitals demonstrating varying degrees of overcrowding that exist. Hospitals C and D are of nearly the same size and are located in the same city. Hospital C which has a theoretical maternity stay of 9.1 days considers itself overburdened, although there are other hospitals within the state that are carrying a much heavier maternity load. However, in a competitive sense hospital C has to offer its patients a shorter postpartum stay than hospital D whose theoretical maternity stay is 13.5 days. Hospitals B and F are located in the same city, but hospital F with 15 licensed maternity beds and a theoretical maternity stay of 48.2 days is a municipal institution and so is not used for private patients.

Hospital E, which has a theoretical maternity stay of 14.6 days, has been

TABLE 1
*Theoretical Maternity Stay in Certain
Selected Hospitals*

| <i>Hospital</i> | <i>Number of Births</i> | <i>Hospital Beds</i> | <i>Theoretical Maternity Stay</i> |
|-----------------|-------------------------|----------------------|-----------------------------------|
| A | 399 | 20 | 6.8 |
| B | 1,803 | 91 | 6.8 |
| C | 656 | 44 | 9.1 |
| D | 672 | 67 | 13.5 |
| E | 490 | 53 | 14.6 |
| F | 42 | 15 | 48.2 |

given a complete federal grant for a maternity building extension. Although this grant was made just prior to the more rigid restrictions on priorities, this hospital was not nearly so overcrowded as were many others in the state. This kind of information should be of value to an agency set up to adjust an equitable distribution of hospital services.

It was interesting to find after computing the theoretical maternity stay for all hospitals that in certain hospitals, where the length of stay before discharging patients was known, the theoretical maternity stays indicated a length of stay *too short* to allow patients to remain as many days postpartum as they were actually remaining. On investigation it was found that *additional* beds were being used for maternity cases.

The average theoretical maternity stay available during the 6 month period for all hospitals in the state was 9.8 days. If we accept a 10-12 day theoretical maternity stay as normal, it would seem that there are nearly ample hospital beds in the state to care for maternity patients at this time. The chief difficulty is in getting the patients to existing facilities.

If we have information on births within a health unit on both a hospital and residence basis, we will be in a position to predict where maternal and child health problems are likely to arise because of increased births. Reference to Table 2 will illustrate this point. Resident births have increased in town M by 52.8 per cent and in town N at

TABLE 2

Theoretical Maternity Stay and Percentage Increase in Resident Births in Selected Towns

| <i>Town</i> | <i>Births by Place of Occurrence</i> | <i>Hospital Beds</i> | <i>Theoretical Maternity Stay in Hospitals</i> | <i>Percentage Increase in Resident Births*</i> |
|-------------|--------------------------------------|----------------------|--|--|
| M | 781 | 43 | 7.4 days | 52.8 |
| N | 389 | 21 | 7.3 " | 57.4 |
| O | 269 | 22 | 11.0 " | 62.9 |
| P | 106 | 16 | 20.4 " | 42.4 |
| Q | 530 | 38 | 9.7 " | 2.5 |
| R | 305 | 25 | 11.1 " | 2.8 |

* Increase between January-June, 1940, and January-June, 1942

the rate of 57.4 per cent, and, as might be expected, the theoretical maternity stays of the hospitals within these towns are very low. In towns O and P the birth increases are 62.9 and 42.4 per cent respectively, but there is no apparent overcrowding of the hospitals' maternity facilities as shown by their relatively high theoretical maternity stays, 11.0 and 20.4 days. Still another situation exists in towns Q and R where the increases in resident births are almost nonexistent, 2.5 and 2.8 per cent in the order named, while the theoretical maternity stays are comparatively low. Clearly, if we were informed on either "the increase in births" in a town or the "theoretical maternity stay," but not both, and attempted to predict the other on the basis of the one we know, we might reach an erroneous conclusion.

2. A very useful arrangement of the data will be a cross-tabulation of the births according to the individual health unit where the mother resides and by the hospital where the birth occurred. This tabulation will furnish information on the movement of mothers for de-

livery, where they went to have their babies, and from what localities they came. In practice, if this tabulation is made, all of the information on births thus far described will be available from this one table.

Having knowledge of mothers who were residents of one town but who were delivered in another, it is possible, with the aid of a road map, to find the distance a mother traveled to be delivered. What type of hospital she went to and what hospital she by-passed can be found by inspection. Table 3 shows the distance traveled by 376 mothers who were delivered in hospitals located in town X but whose residence was nearer to another general hospital.

For example, 14 mothers traveled 20-25 miles to be delivered in town X, whereas the nearest general hospital licensed for maternity patients was 5-10 miles from their residences.

There were 3,013 births occurring in hospitals in town X—1,366 were to mothers who were residents of towns other than town X, and of these 376, or 27.5 per cent, traveled farther to be

TABLE 3

Distance Traveled by Mothers to Be Delivered in Town X Compared to Distance to Nearest Hospital

| | | <i>Distance to Town X</i> | | | | | <i>Total</i> |
|-------------------------------------|--------------|---------------------------|--------------|--------------|--------------|----------------|--------------|
| <i>Distance to Nearest Hospital</i> | <i>Miles</i> | <i>5-10</i> | <i>10-15</i> | <i>15-20</i> | <i>20-25</i> | <i>25 over</i> | |
| | Less than 5 | 106 | 44 | 50 | 1 | 15 | 216 |
| | 5-10 | 75 | 2 | 3 | 14 | 15 | 109 |
| | 10-15 | .. | .. | 17 | 3 | 4 | 24 |
| | 15-20 | .. | .. | 9 | 6 | 12 | 27 |
| <i>Total</i> | | 181 | 46 | 79 | 24 | 46 | 376 |

delivered in hospitals in town X than if they had gone to their nearest hospital. If the time comes when hospital facilities must be rationed, such information as this will be useful. Also it may be possible to determine from such information the cost of allowing patients to choose their place of delivery.

Information concerning hospital and home deliveries can also be determined. As in other states, the proportion of hospital deliveries has been increasing in Connecticut in recent years. This trend continued in Connecticut during the first 6 months of 1942. In 1940, 90.8; in 1941, 94.0; and for the first 6 months of 1942, 95.8 per cent of the births occurred in hospitals. However, factors such as an increased birth rate and overcrowded hospitals are now rising which may influence this trend. If home deliveries do increase, either in the state as a whole or in some area in the state, it will be advisable to know this so that more attention may be directed toward stimulating home delivery nursing services and enlisting local women's organizations to make obstetrical bundles for physicians' use at home deliveries.

When a hospital's maternity facilities are overtaxed, it will be obliged to limit its admissions to the number for whom safe care can be given. In order to offer care at the time of delivery to as many mothers as possible, the hospital may have to reduce the length of stay of postpartum cases. It is recommended that a public health nurse or other designated worker visit the home of every expectant mother to evaluate the suitability of the home for delivery and for care of the mother after early discharge from the hospital. If such a visit is made by a public health nurse, she can easily guide the mother in making preparations. Either a public health nurse or another designated worker can cooperate with the hospital in its selection of patients for early discharge by reporting her findings of the home conditions.

From information on the birth certificate we know which hospitals are overtaxed and which communities could improve their care for mothers and newborn infants by making investigations of the homes.

3. There is a Connecticut statute which became effective July 1, 1941, that requires each physician giving prenatal care to the pregnant woman in the state to take or cause to be taken a blood test for syphilis within 30 days from the date of the first examination, and to state on the birth certificate whether the test has been made and, if made, the date when such test was made and, if not, the reason why such test was not made.

It is possible to determine from information on the birth certificate how the law is being carried out. It was found that 13,540 of the 15,787 cases studied, or 85.8 per cent, answered the question "Was a blood test made?" while the remaining 2,247, or 14.2 per cent, did not answer the question. Of the 13,540 cases reported on, 12,522, or 92.5 per cent, stated that a blood test actually had been made while in the remaining 1,018, or in 7.5 per cent of the cases, it was specifically stated that no blood test was made. The second part of the blood test question asks "date of test?" This question was answered on 10,691, or 85.4 per cent, of the 12,522 records where it was stated a blood test had been given.

This information is of value to those administering venereal disease programs as well as those concerned with maternal and child health problems. Knowledge of the month that the pregnant women received a blood test is important when evaluating the effect of a venereal disease program while the stipulation in the law that the blood test be given within 30 days of the first examination furnishes a valuable index on the time of the mother's first visit for prenatal care. The distribution of the 10,691 cases that

reported on the date of the blood test according to the time during pregnancy that the test was made follows:

| <i>Time blood test made</i> | <i>Number</i> | <i>Per cent</i> |
|-----------------------------|---------------|-----------------|
| Before fifth month | 4,549 | 42.5 |
| Fifth month to term | 5,407 | 50.6 |
| Same day or after delivery | 735 | 6.9 |
| Total | 10,691 | 100.0 |

It was interesting to see that the answering of the question on the blood test followed a hospital setup, with certain hospitals reporting nearly completely and others not at all. It is hoped that in the future, in the case of those physicians who have not reported the date of the blood test, a convenient method can be devised of transferring this information from their office records to the hospital records in order that reporting can be complete. We believe this would reduce the number of those not reporting.

4. The birth records may be divided according to the occupation of the father. This information can be used to find an estimate of the number of wives who would be eligible for care under the program for medical care for wives and children of men in military service (except commissioned officers) and to get an estimate of the number of fathers who worked in industries which are predominately engaged in war production. It was found that, for the first 6 months of 1942, out of 15,787 births 272, or 1.7 per cent, were born to wives of service men (except commissioned officers). This figure could be used as a maximum number of wives who might be eligible for care. We were also able to estimate from the data on occupation of father that approximately 50 per cent of the fathers of infants born during this period were engaged in war production industries. In planning for the medical care of these infants through their preschool years some thought should be given to the eco-

nomic status of families now supported temporarily by war industries.

We are aware of a case where a hospital in the state, admittedly overcrowded, was refused a request for materials to build a new wing because it was felt that other hospitals with similar needs were giving service to a larger proportion of families where the wage earner was engaged in vital war production. As we had sorted the question on occupation of father on a hospital basis we were able to test whether this assumption was correct. We found within reasonable certainty that this hospital was exceeded by only one other in the state in so far as the percentage of births to fathers engaged in war production industries was concerned.

It was felt that the mother's choice of hospital for delivery might be influenced by the location of her husband's place of employment. If this were so, we should expect to find, among those mothers who traveled to be delivered, a larger proportion of the wives whose husbands worked in a town going to that town to be delivered than of the wives whose husbands did not work there. As the code on occupation of the father had also been arranged to identify the names of certain selected industrial plants where the fathers worked, it was possible to test this hypothesis. The records of those births where the father was known to be employed in a certain factory were separated according to whether his wife was delivered in the town where he worked (designated town Z). In order to eliminate the residents of town Z and residents of other towns who would be expected to utilize only those hospitals in town Z, we used only those towns where less than 75 per cent of the cases had been delivered in town Z during the survey period. Eighty-three of the 289 mothers whose husbands worked at the factory in town Z, or 28.7 per cent, came to town Z to be

delivered. Using the same towns as a base, it was found that, of the remaining 1,086 births where the husband did not work at the selected industrial plant, 204, or only 18.8 per cent, came to town Z to be delivered. It would seem that there was evidence to support the opinion that the father's place of employment influenced the mother's choice of hospital. It might be well for the public health nurse to inquire into the mother's motive when it is known that she intends to travel farther than necessary to be delivered, especially when the hospital she plans to attend is in a shortage area.

5. The occupation of the mother was tabulated to learn the extent to which pregnant women were working outside the home. Although our experience led us to believe that the reporting on this item made it unreliable to use, it is felt that the question was not clearly defined. The expectant mother may have worked outside the home prior to and during part of her pregnancy but we have reason to believe that she will report her occupation as "housewife" if asked during the latter part of her pregnancy after she has stopped working. We feel that it would assist the person filling out the birth certificate if the question on the mother's occupation were worded: (a) Employed outside the home during pregnancy Yes No; (b) If yes, usual occupation; (c) Industry or business

6. If we know that the population within a health unit is being increased

because families are moving in from other areas, we should be interested in finding out if there is any difference between the old and new residents in respect to the factors associated with the births. Since the birth certificate asks the "length of mother's stay in this community" it was possible to separate the births on this basis. It was necessary to limit the analysis to those births where the residence of the mother was the same as the town where she was delivered. This situation existed because the question on "length of stay" is asked under the block headed "Place of Birth." We feel that this question would have more utility if asked under the block headed "Usual Residence of Mother." Although we have information on "length of stay in community" on only 6,705 of the 15,787 births reported, we feel that any errors that the data may contain are not selective to the birth certificates on which has been reported the length of stay in the community.

Table 4 presents the distribution of the 5,328 births on which was reported the month of gestation at which mothers had a prenatal blood test according to the length of stay in community. The mothers who had been residents of a town for 6 months or less did not have a blood test as soon as mothers in the other classifications. It would seem, however, that the new residents adjusted themselves very quickly to the standard of the older residents in the matter of seeking early prenatal care.

TABLE 4

Time of Blood Test by Length of Mother's Stay in Community

| <i>Length of Mother's Stay</i> | <i>Total Reporting No.</i> | <i>Before 5th Month</i> | | <i>5th Month to Term</i> | | <i>Same Day or After Delivery</i> | | <i>No Test Taken</i> | |
|------------------------------------|------------------------------------|-----------------------------|----------|------------------------------|----------|---------------------------------------|----------|--------------------------|----------|
| | | <i>No.</i> | <i>%</i> | <i>No.</i> | <i>%</i> | <i>No.</i> | <i>%</i> | <i>No.</i> | <i>%</i> |
| Under 6 months | 244 | 53 | 21.7 | 144 | 59.0 | 30 | 12.3 | 17 | 7.0 |
| 6-11 months | 333 | 131 | 39.4 | 157 | 47.1 | 18 | 5.4 | 27 | 8.1 |
| 12-23 months | 428 | 175 | 40.9 | 196 | 45.8 | 27 | 6.3 | 30 | 7.0 |
| 24-35 months | 236 | 104 | 44.0 | 109 | 46.2 | 11 | 4.7 | 12 | 5.1 |
| 36 months and over | 4,087 | 1,625 | 39.9 | 1,895 | 46.3 | 209 | 5.1 | 358 | 8.8 |
| Total | 5,328 | 2,088 | 39.2 | 2,501 | 46.9 | 295 | 5.5 | 444 | 8.3 |

Table 5 shows the distribution of 6,674 births on which was reported the order of birth according to the length of the mother's stay in the community. It is apparent that a trend exists toward smaller families in the newer population groups especially in the proportion of mothers having their first baby. It is not certain whether this smaller percentage of first births (births of order I) to residents of less than 6 months reflects a real change. It may be, since these women were pregnant when they moved, that the primiparae were reluctant to leave their old homes before their babies were born.

In addition to the items mentioned above, it is possible to separate the

necticut which receive in the State Bureau of Vital Statistics copies of birth certificates from the local registrars are not in a position to refer cases into the field soon enough to be immediately effective. However, many of our larger cities, as well as health units in many other states where the registrar receives the birth certificate directly, can work out a system which will best serve their own needs according to the facilities which are available. New York City, which has been a pioneer in the use of the birth certificate for case finding in the maternal and child health program, now requires the physician to file a birth certificate within 48 hours after the birth.

TABLE 5

Order of Births according to Length of Mother's Stay in Community

| <i>Length of Mother's Stay</i> | <i>Total Reporting No.</i> | <i>Births of Order I</i> | | <i>Births of Order II</i> | | <i>Births of Order III and Over</i> | |
|------------------------------------|------------------------------------|------------------------------|----------|-------------------------------|----------|---|----------|
| | | <i>No.</i> | <i>%</i> | <i>No.</i> | <i>%</i> | <i>No.</i> | <i>%</i> |
| Under 6 months | 302 | 170 | 56.4 | 70 | 23.2 | 62 | 20.5 |
| 6-11 months | 403 | 276 | 68.5 | 72 | 17.9 | 55 | 13.6 |
| 12-23 months | 551 | 351 | 63.7 | 100 | 18.2 | 100 | 18.2 |
| 24-35 months | 306 | 159 | 51.9 | 87 | 28.4 | 60 | 19.6 |
| 36 months and over | 5,112 | 2,302 | 45.0 | 1,463 | 28.6 | 1,347 | 26.4 |
| Total | 6,674 | 3,258 | 48.8 | 1,792 | 26.9 | 1,624 | 24.3 |

births according to any other information contained on the birth certificate. The factors of age of mother, age of father, legitimacy, past mortality experience of the mother and prematurity are tabulated annually by the Bureau of Vital Statistics but may have added value in the planning of a maternal and child health program if the information is available on a current basis.

The birth certificate furnishes, moreover, a valuable means of locating and selecting cases that need special attention. The value which the birth record may have in selecting individuals for direct service depends upon the speed with which the information can be made available to the medical and nursing field staffs. States like Con-

SUMMARY

In practice the director of maternal and child health would ask the director of vital statistics for guidance in determining what information from the birth certificate could be made available and the form in which it will be most useful. In some vital statistics divisions, it may be a practice to code and punch the information from birth certificates after the end of the registration year rather than currently. In this case it will be possible to secure only a minimum amount of information, but even this will be worth while to the division of maternal and child hygiene. There may be additional items which appear on the birth certificate which formerly were not tabulated, but may be of value,

and now the use of them justifies the past decision to include them on the birth certificate.

The pattern of life in all sections of the country is being disturbed during this wartime period. Redistribution of families with children, overcrowding of housing units, wives and infants of soldiers, and working mothers bring new health problems at a time when public health personnel is needed for work connected with the war. Information which will locate these sore spots is

available on the birth certificate. To be of value it needs to be used currently.

NOTE: In the preparation of this paper, valuable assistance was received from Jacob Yerushalmy, Ph.D., Director, Division of Statistics Research, Children's Bureau, U. S. Department of Labor, who indeed inspired and suggested the study. We should like to thank Mrs. Caroline A. Sheehan, Chief Tabulator, Bureau of Vital Statistics, Connecticut State Department of Health, whose assistance with the tabulation contributed to the completion of the paper.

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TRENDS AND FORCES IN PUBLIC HEALTH ADMINISTRATION

NO sensible person would undertake to prophesy the extent and character of public health work during the next ten years. The situation contains too many variables and intangibles to permit a detailed forecast. It seems fairly safe, however, and possibly may be of benefit, to review those factors and pressures which have shaped public health practice in the past. Then, on the assumption that they will continue, one may attempt to guess how they will influence and be influenced by existing and future pressures.

Viewing the past, one must be impressed by the fact that, broadly speaking, two influences have tended to determine the amount and kind of public health work done by the health departments. The first of these has been the extent of scientific knowledge available; and the second, social concepts as manifested in government. The way in which these forces have operated has not been simple, but rather the contrary. For instance, whether in the past or future, mere possession of knowledge as to control of a given disease is not enough. Such knowledge remains only of academic interest unless it can be applied. Its application, in turn, may be inhibited by excessive costs, by diffuseness of the problem to be met, by the fact that control measures would entail restrictions of daily living, or a meticulousness in personal conduct that human beings will not observe. Again, the public health methods available for application of scientific knowledge may be quite clumsy, or the public or officials of government or the medical profession may not be receptive to its application under governmental auspices.

Always these factors have acted and reacted upon one another in any attempt to apply scientific knowledge. The result is that as newer knowledge became available it was applied more here and less there, but nowhere in full force; and although there was always a net gain to the public health, accomplishments fell far short of what was possible.

The rôle of the second element mentioned above, that is, current social philosophy, and its influence on the amount and kind of public health work done, was and is exceedingly complex. It is also very important, for the structure and function of a health department, the type of its administration, and the scope of its health program, must inevitably fluctuate within the framework of the government of which it forms a part. Further, these health activities were and will currently be shaped by the policies of the government's chief executive and cabinet, by its legislative body, to some extent by its courts, and by its economic resources. This applies in all governmental spheres: federal, state, and local. Behind the governments, of course, is public opinion which, though sometimes slow and fumbling, always and inevitably makes itself felt. In relation to health work, public opinion was sometimes crystallized and produced voluntary health organizations long before the influence of this opinion brought action through governmental authorities.

Because government and its contained social philosophy influences health work, it is important to note that all levels of government in the United States are undergoing change. Of significance in this connection is the fact that larger governmental units are becoming more articulate and forceful in imposing benefits and policies upon smaller ones. Federal tends to press upon state and state upon local. This is made effective and painless by the use of subsidies from above downward. Billions of dollars, and even millions, are deep-voiced and persuasive. Another significant change is that federal government is tending strongly toward social legislation containing provisions as to health and medical care.

Summarizing the trend in these principal forces which shape the work of health departments, it may be said that in the field of scientific knowledge, upon which public health work must rest, one finds a broader base than ever before existed, with the promise of much more to come in the near future. Sociologically, one finds a federal government strongly inclined toward legislation and appropriations for social betterment, with an increasing tendency to raise the ceiling on benefits the citizen has a right to expect of government, and somewhat strong-armed as regards *meum et tuum* in federal-state relationships.

It seems inevitable that out of these broadening resources and strong tendencies, unless there is a post-war relapse into rugged individualism, the pattern of public health practice will be shaped more than ever before by federal agencies, that better standards of work and a greater uniformity of procedure will come into play, that more funds will be available, that there will be higher qualifications for public health personnel, with civil service tenure of office which will protect alike the just and the unjust and those who are good and those who are not so good. It seems likely, too, that there will be a lessened sharpness in the dividing line between preventive and curative medicine, that much of medical care will become a function of public health service, that public health organizations will, by nature and resources, be better prepared to apply new knowledge as it becomes available.

Some of those engaged in public health work would welcome these things, including their derivations and implications, with shouts of glee. Others will wonder if the surrender of considerable local initiative will not, in the end, be too high a price to pay. In any event, it seems reasonable to believe that modern public health service will be extended to the uttermost rural hamlet and township, and perhaps even to a few of those cities now sitting upon their ancient and somewhat withered public health laurels.

ARE COUNCIL AND BOARD MEMBERS PEOPLE?

PARENTS appear to be divided into two classes. First, there are those who hope, naively, to carry their youngsters through adolescence without experiencing mental anxiety for, and clashes of will with, their children. Second, there are those who have tried to do this and know it cannot be done.

Parents who expect to avoid disobedience and sowing of wild oats on the part of their children, seem to forget that they themselves, if they are now bearable and effective personalities, gave their parents some disquiet. They overlook, too, the fact that if there is to be no disobedience, no resentment of authority, no venturing into new and perhaps dangerous fields, the new generation would be but a replica of the old. It would be disastrous if this should happen in any large proportion of the young people. For one thing, it would seriously retard progress of race and civilization, for older people and their prototypes tend to develop too great an esteem for precedent, to resent the threat of change. Further, new horizons would remain unexplored, for the old mind is not curious as to what is beyond the hill, provided it is not the poorhouse. What is needed is the commando type who will not only go over the hill, but will acquire the poorhouse and either burn it down or turn it into a night club.

As with parents and families, so it is with business, industries, organizations, and associations. Chronic chairmen, perennial board members, and ubiquitous committeemen tend to assume a parental rôle in organizations and, just as parents cannot concede that a new generation has arisen, so these elder statesmen insist that policies of the past must shape current and future procedures.

It is at least permissible to wonder if these things might not well be taken to heart in professional organizations, such as the American Public Health Association. The Editor has a feeling that old names and old faces, including his own, have too long occupied strategic positions on boards and committees; that not enough thought has been given to the necessity of harvesting the presently maturing crop of epidemiologists, administrators, nurses, engineers, laboratory workers, etc., etc. When we, as a Fellow of the Association, attend a committee meeting, we have a pleasant assurance that we shall meet old friends. At the same time, we experience a dull distress because we know that we shall not find new, or even foolish, enthusiasms, or venturesomeness, and youthful vigor.

If someone wants to campaign for a candidate under forty for the Governing Council, the Executive Board, or Editorship of the JOURNAL, we shall joyously back his man (unless he has served a prison term of more than a year *) against the fifty-and-over field.

* Make it two years.

BOOKS AND REPORTS

Victories of Army Medicine: Scientific Accomplishments of the Medical Department of the United States Army—By Edgar Erskine Hume. Philadelphia: Lippincott, 1943. Price \$3.00. 250 pp.

The Medical Department of the United States must be credited with many notable achievements. Three immediately occur to anyone who knows anything of medical history: the experiments by Beaumont on Alexis St. Martin; the conquest of yellow fever by the committee of which Walter Reed was chairman; and the Army Medical Library with its *Index Catalog* for the great development of which we are indebted to the late John S. Billings. Of these, Dr. William H. Welch regarded the last as "America's greatest gift to medicine." The conquest of yellow fever is rightly considered one of the most beneficent gifts to mankind, and the work of Beaumont was the first really scientific study of digestion, on which life depends.

Not only does Colonel Hume give the record of the U. S. Army, but also some of the history of the Medical Department of the Confederate Army during the Civil War. When the South seceded 3 surgeons and 23 assistant surgeons gave up their commissions in the U. S. Army and went to the defense of their Confederacy. The history of the Confederate Army remains to be written, and the records of the Surgeon General's office were burned at the fall of Richmond, but Colonel Hume mentions several notable achievements. The Confederacy founded and conducted the Chimborazo Hospital at Richmond, Va., which with its 9,000 beds, became the largest military hospital that has ever existed in

America. It was in the charge of Surgeon James B. McCaw, father of General Walter D. McCaw, Chief Surgeon of the A.E.F. in the World War. A notable accomplishment also was the book by Dr. Francis Peyre Porcher who was a skilled bontanist as well as a physician. The book, *Resources of the Southern Fields and Forests*, was written in order to supply the medical deficiencies of the Southern Army since medicines were contraband of war. The Surgeon General of the Confederate Army founded also the Association of Army and Navy Surgeons, the oldest American military association of the country, since the present Association of Military Surgeons was founded only in 1891.

Once again Colonel Hume has put the medical profession of the country in his debt, and has done a notable service in writing this memorial to the great men who have served in our armies. Like all of Colonel Hume's writings, the book is filled with facts of the most interesting character, which any reviewer finds it hard to pass without mention. The book is entirely up to date, including the most recent additions to our medical outfit, such as dentistry, nursing, and veterinary medicine. Aviation medicine and warfare gases are considered. Accounts of the many medical boards are also given, and short sketches of a number of the chiefs of other branches of the Army than the medical are also included. There is a list of all the chiefs of the medical department of the U. S. Army, beginning in 1775 and going to 1939; of the librarians of the great library, the curators of the Army Medical Museum, General Hospitals created before 1940, and those since. There are com-

plete references to the subjects considered. Altogether the book is most valuable and interesting.

It is but natural that Colonel Hume should wish to give all possible credit to the Army, but we must take exception to his attributing to General Sternberg the discovery of the pneumococcus (page 187). There is no doubt that he saw it but so did Pasteur the same year, though neither suspected its relation to pneumonia. Acting Assistant Surgeon Aristides Agramonte, who was a member of the Yellow Fever Board, is said to have been Professor at the University of Havana until his death. This may be correct, but he was also at the time of his death Professor of Tropical Medicine at Louisiana State University. The library of the Medical School of the institution is named "The Agramonte Memorial Library."

The book is beautifully printed and profusely illustrated. One color plate shows Colonel J. S. Billings in uniform, over which is the gown of Doctor of Civil Laws of Oxford University. Reproductions of many title pages of notable publications abound. It is a "must" book for all medical libraries and contains information which educated people generally should have.

MAZÛCK P. RAVENEL

Sanitary Inspector's Manual—By Ben Freedman. New Orleans: Louisiana State Department of Health, 1943. 360 pp.

In this manual an effort has been made to bring together information useful to the Louisiana sanitarian. It is put together in such a way as to be adaptable to field use, has numerous illustrations and a good index. Generous quotations are made from standard documents to avoid repetition. The entire environmental sanitation field is covered with due respect, of course, to the laws and regulations of the state in which the manual is to be used. This

manual should be popular with Louisiana sanitarians for it contains the material for use in formulating answers to most of the problems such workers will face. To be most useful, however, this manual will have to be kept abreast of the times. ARTHUR P. MILLER

Synopsis of Diseases of the Skin—By Richard L. Sutton, M.D., and Richard L. Sutton, Jr., M.D. St. Louis: Mosby, 1942. 413 ill., 481 pp. Price, \$5.50.

The authors have succeeded admirably in their objective, which is to present in compact form a general view of skin diseases. It is obvious that effort has been made to eliminate unnecessary discussion in the interest of simplicity and practicality.

The section on syphilis discusses in a few lines massive dose arsenotherapy in early syphilis. This important subject, which has been hailed as the greatest advance in the treatment of syphilis since the discovery of salvarsan, deserves more space, especially since massive dose therapy is being adopted in many centers in this country, as well as abroad. It is regretted that the word *metarsen* is employed as a synonym for mapharsen. The original non-proprietary designation for this compound was arsenoxide; more recently, and particularly since other manufacturers in this country are preparing it, the term phenarsine oxide hydrochloride has been adopted. The introduction of this strange new term (unknown even to the manufacturing concern which makes mapharsen) will only serve to confuse the reader.

The inclusion of excerpts from original contributions, for example, Shelmire on plant dermatitis, Cole on cardiovascular syphilis, O'Leary on neurosyphilis, and Moore on syphilitic optic atrophy, enhances the value and authority of the volume.

Public health workers may find that

the section on leprosy gives too optimistic a picture of the effects of chaulmoogra oil. McCoy recently stated: "My own observations have led me to the conclusion that the oil and its derivatives are of little or no curative value, and that the unpleasant side effects probably outweigh any advantage to the patient that might possibly accrue from their use."

This book is highly recommended as an up-to-date comprehensive presentation of cutaneous diseases. The reader is constantly amazed at the mass of information contained in a text of 481 pages. Of this volume it may truly be said "multum in parvo."

THEODORE ROSENTHAL

The National Nutrition—By *Morris Fishbein, M.D.* Indianapolis: Bobbs-Merrill, 1942. 192 pp. Price, \$1.75.

This little book is presumably addressed to laymen as it includes material previously published in *The Saturday Evening Post*, *Red Book Magazine* and *Hygeia*. It seems well suited to the purpose, as it is readable, even amusing in parts, and more than reasonably accurate. The author touches very briefly on many difficult subjects. His object seems to be to draw attention to significant facts which illustrate a moral, rather than to cover the subject, and with this in the case of such a book, one can find no fault. However, it is not in any sense the type of book which seeks to present a particular point of view. The intelligent layman who reads it will be interested, amused, and moderately instructed.

FRANK G. BOUDREAU

China's Health Problems—By *Szeming Sze.* Chinese Medical Association, Washington, D. C., 1943. 60 pp.

This is the second edition of a volume first published in May, 1942, which sets forth in succinct form an up-to-date

review of China's health problems, including sections on health education, medical education, state medicine, civilian medical relief, the Army medical services, and other subjects. An excellent appendix gives briefly the present status of governmental and voluntary health agencies in China. The author, who is General Secretary of the Chinese Medical Association and Editor of the *Chinese Medical Journal*, is now in the United States.

REGINALD M. ATWATER

Serology in Syphilis Control: Principles in Sensitivity and Specificity—By *Reuben L. Kahn, M.S., B.Sc.* Baltimore: Williams & Wilkins, 1942. 206 pp. Price, \$3.00.

The importance of this monograph is well bespoken by a single figure: the 16,520,591 serological tests for syphilis performed in this country in 1941. The author has essayed to discuss the implications of variations in serologic specificity and sensitivity to the problem of syphilis control. He has neatly avoided the usual pitfall of the serologist: the tendency to enlarge upon the fascinating details of technic, and has so kept his text within the scope of most of us. The discussions of sensitivity, specificity, supersensitive tests, quantitative serologic reactions, the side effects of mass blood testing programs in the general population and in industry are worth the time of every health officer and venereal disease control officer. A series of papers presented by industrial physicians and venereal disease control officers at a conference called by the author to discuss his verification test are of less importance but are not without interest.

The central thesis of this essay is the importance of specificity in a serological test. When the vast number of routine examinations of serum are considered the number of people affected by a fluctuation of only 1 per cent in the

specificity of a serologic test is rather startling. The 99 per cent specificity which has been considered satisfactory and which seems admirable in comparison with other diagnostic tests may be too loose a criterion.

The plaguing possibility that we diagnose and treat as syphilitic a group of persons whose sera react as do syphilitic sera, but who are not actually infected with the disease, is raised again by the author's discussion. Perhaps we should not assume that every person with a definitely positive serologic reaction has syphilis because almost every syphilitic has a positive serologic reaction. The author seems to proffer his interesting verification test as a partial solution to the problem of detection of biologic false positive reactions. But the interpretation of this test is based upon another assumption: that the reaction which may be detected in the normal sera of various animals is due to the same factor which makes for the false positive reaction in human sera. It would have been interesting to hear more of the proportion of presumably false positive reactions in which the verification test was of assistance in interpretation. But since this test is not susceptible to routine application because of the time and special skill required for its performance, we must continue to regard a definitely positive reaction of a standard test, confirmed by a second examination as sufficient evidence for a diagnosis of syphilis when other diseases tending to produce serologic reactions can be ruled out.

The author reiterates the now familiar plea for a standardization of the sensitivity level of sero-diagnostic tests. It is suggested that such a measure need not, as is often maintained, inhibit the development of new serologic tests or prevent the improvement of those we now have, for the performance of experimental tests which need not be reported could certainly continue. In-

deed, a standardized test could be a criterion of the newer tests. No solution to the major obstacle to such a standardization is suggested: the loss in sensitivity which would result in some laboratories from fixation of the sensitivity level at the average of the least sensitive test considered acceptable.

Serology in Syphilis Control is not a reference text but a thoughtful "Quo Vadis" which is well worth the attention of health officers, laboratory directors, and venereal disease control officers.

JAMES H. LADE

Practical Survey of Chemistry and Metabolism of the Skin—By Morris Markowitz. Philadelphia: Blakiston, 1942. 196 pp. Price, \$3.50.

The book is divided into four parts. The first part goes into the chemistry of the skin itself, giving information not usually found in textbooks on dermatology. Abstracts from the writings on the subject are given and the diseases in which there are deficiencies or excesses of each of the chemical constituents of the skin are named.

The second part of the book deals with hematology and gives the blood abnormalities associated with or diagnostic of various skin diseases.

The third part is on blood chemistry and gives the diseases in which there are changes in the blood nitrogen, blood cholesterol. A special chapter is devoted to histamine and its relation to allergic dermatoses. The chapter devoted to photosensitization and porphyrins is of especial interest.

The fourth part describes the vitamins and gives the diseases in which there is a deficiency of the various vitamins and the skin diseases in which their administration is indicated. It also lists the diseases which may be caused by the excessive intake of some of the vitamins.

Abstracts of the literature make up most of the book. Since many of the

quoted statements in the book are unsubstantiated, it would have been desirable to have the author express his own views on the matter.

An extensive bibliography is appended to each chapter.

LOUIS SCHWARTZ

A Family of Thirty Million—By L. I. Dublin, Ph.D. *New York: Metropolitan Life Insurance Company, 1943. 496 pp.*

Thirty million policy holders of the Metropolitan own nearly \$27,000,000,000 of life insurance. And there is probably no person in the United States who does not enjoy some measure of its protection. What began as a small business in the turbid days following the Civil War has grown to be an American institution. During its early struggles the company seized the opportunity of underwriting the insurance of a sizable society of working people and this experience opened for it the unexplored field of industrial insurance. Concern for the wage earner led to an intelligent desire to better his social conditions. Later, the "ordinary" business was revitalized, largely by bringing 800 field agents and their families to this country from England, but that did not divert the company from its course of studying and meeting the needs of the common man.

A fortuitous meeting of Haley Fiske, President, and Lee K. Frankel, marked the beginning of its systematized welfare program and another happy contact of Dr. Frankel with Lillian D. Wald led to the company's interest in public health nursing. Steadily the welfare program advanced; benevolence and business prospered side by side.

JOURNAL readers familiar with the company's generous participation in public health enterprises will appreciate not only the compact description of the welfare services but also the clear exposition of the principles of life insur-

ance, its business and social implications, and the brief sketches (and excellent portraits) of the guiding spirits. If the tone is at times a bit laudatory this is compensated by the wealth of statistical and factual data. The book memorializes the company's 75th anniversary; its appearance at this time, when understanding of social security is so essential, is most opportune.

H. E. KLEINSCHMIDT

The March of Medicine. *The New York Academy of Medicine Lectures to the Laity, 1942. New York: Columbia University Press, 1943. 217 pp. Price, \$2.50.*

The only excuse I have for writing this review is that I was asked to do it, and that since the lectures were given for the laity, presumably a layman will be able to interpret them for the laity.

Three of the lectures are on well known topics: Tuberculosis, By James Alexander Miller; The History of the B-Vitamins, by Norman Jolliffe; and The Newer Knowledge of Nutrition, by A. J. Carlson. The other three are more abstruse: The Brain and the Mind, by Tracy Jackson Putnam, which is delightful; The Freudian Epoch, by A. A. Brill, which is very informative; and Genius, Giftedness, and Growth, by Arnold Gesell, which goes into flights well above the mentality of the average reader.

There are many statements in each of these lectures which the reviewer would like to comment upon and bring to our readers, but from the standpoint of practicability and interest, we must devote most of our attention to the lecture by Dr. Carlson, which is a criticism of the vast amount of guff which is being poured out to the public through every agency that can be conceived of. Dr. Carlson brings to his subject an exact knowledge, a love of truth, and a devastating wit. He spares no one in his criticisms, which are in every case

authoritatively documented. Concerning the vitamin craze, he quotes from R. R. Williams and R. J. Williams, both of whom, in spite of their excellent work, have made statements and drawn conclusions which border on the chimerical. To go higher up—at least officially—he touches up Mr. McNutt and Surgeon General Thomas Parran, both of whom have made wild statements which do not seem to be supported by facts. Mr. McNutt makes one statement “with the usual lay testimonials which from any other layman would be labeled quackery”; namely, that a trucking company had reduced its night accident rate by giving each driver a bag of carrots before each trip. Most of the statements by Dr. Parran and Mr. McNutt seem to be based upon a series of surveys conducted by the Bureau of Home Economics of the Department of Agriculture assisted by the Department of Labor. They covered only 4,000 urban and 2,000 rural families. The field investigators, some on WPA, depended entirely on the statements of the people questioned. There was no physical or medical examination, determination of body weights, but on the basis of this report the country has rung with statements that at least a third of our population is deficient in nutrition—a statement not borne out by many known facts. Then we have the report of the Subcommittee on Medical Nutrition of the National Research Council which seems to contradict itself, in spite of its imposing origin.

One must read this paper to appreciate its value as well as its keenness. It seems a fashion, led by some in high places as mentioned, to paint the picture as black as possible. In his concluding plea for greater scientific understanding as to human food needs for optimum health, Dr. Carlson demands that we “cleanse our present food and nutrition science of all fads, of all commercial and political propaganda; and

move it from the ivory tower down to comprehension and appreciation of the common man.”

We wish that Dr. Carlson's paper could have a very much wider circulation than this volume will give it. We surely need something to counteract the deluge of radio and other stuff concerning the vitamins from which we are suffering, and it is evident that this information should be given to many who occupy high places, both official and educational.

MAZÛCK P. RAVENEL

Essentials of Industrial Health—
By C. O. Sappington, M.D., Dr.P.H.
Philadelphia: Lippincott, 1943. 626 pp. Price, \$6.50.

This book according to the author represents the application of preventive medicine and public health to industry following closely a recently proposed course for the undergraduate medical student. A wide range of topics is covered in three parts carrying the following titles: Industrial Health Administration, Industrial Hygiene and Toxicology, and Industrial Medicine and Traumatic Surgery. The opening chapter discusses the origin and later development of industrial health throughout the world, and serves to give the reader a fairly complete historical account of the development of this important phase of preventive medicine and hygiene.

In discussing occupational morbidity and mortality in Chapter 2 the author stresses the fact that since true occupational disabilities are a very small part of the whole burden of sickness, the major problem of lost time in industry lies in factors which produce disability common to the general population and outside of industry.

Chapter 3 discusses the distribution of industrial health services beginning with definitions of the scope and objectives of industrial health and includ-

ing estimates of the costs of industrial health service, and the economic and other benefits to be derived therefrom. Reasons why management should be interested in the health of the workers are well stated.

Chapter 4 classifies industrial physicians according to the amount of time spent in rendering services to industrial establishments.

In Chapter 5, which discusses the medical department, it is evident that the author has had the opportunity of obtaining information at first hand. Various aspects regarding quarters are well presented and illustrated with good photographs. In general, the facilities shown are the ideal rather than the average. Little mention is made of "retooling" obsolete medical facilities. Much attention is given to physical examinations of workers. There is a separate section on the special health problems of small plants.

Part II begins with a chapter on industrial health exposures. Included are a series of classifications of dusts, vapors, gases, and skin irritants. Postural strains are briefly treated. More than half of the chapter is devoted to a reproduction of the section in U. S. Division of Labor Standards *Bulletin No. 41* entitled, List of Hazards, Symptoms, Occupations Exposed and Methods of Prevention; the section Alphabetical List of Hazardous Occupations, is not reproduced. Reference is made to safe concentration codes.

In Chapters 7 and 8 the author gives the present-day methods employed in making an industrial hygiene survey of a plant, and the technics involved in determining occupational exposures to hazardous materials and conditions in the working environment. Although it is obviously impossible in a book of this scope to present all the necessary technical details, the author does give sufficient information and references so that the reader will be at least apprised

of the type of work involved in the plant survey and in the matter of plant sanitation and hygiene.

Under personal hygiene for workers is included information regarding toilets and washrooms, fatigue control, nutrition, housing, recreation, and mental hygiene.

In Chapter 10 the author indicates that the industrial physician is in reality the public health officer in industry and therefore should coöperate with all the official health agencies in his community. Subjects presented include the control of tuberculosis, venereal diseases, communicable diseases, and industrial wastes. There is also a brief discussion of health and safety codes and regulations.

Chapter 11 deals with the worker and the job. From the viewpoint of the worker, consideration is given physical and mental fitness, aptitude and psychologic tests, medicine and personnel relations, and women in industry. Under job requirements is included a discussion of length of work week, hours of work, rest pauses, and environmental factors.

One chapter each is devoted to industrial accidents, occupational diseases and non-occupational disabilities. Statistics are given which indicate the extent of some of these problems. The discussion covers broad aspects of morbidity with little attention to clinical features.

The final chapter treats workmen's compensation and rehabilitation under the three sub-headings of administrative methods, medical relations and regulations, and insurance practice.

There are extensive appendices, a list of references, an index of proper names, and a subject index.

J. G. TOWNSEND

The Health Status of N. Y. A. Youth—A Nation-wide Survey of Youth on the Out-of-School Work

Programs of the National Youth Administration. *Federal Security Agency, U. S. Gov. Ptg. Office*, Washington, D. C., 1943. 77 pp.

This report confirms the findings of previous studies of physical fitness of American youth. It is based upon 146,567 complete physical examinations of 71,096 males and 75,471 females between the ages of 16 and 24 years. These young men and women were employed, or seeking employment, on out-of-school work projects of the National Youth Administration. The report states that "the examinations of the present study included classification of each youth on the basis of employa-

bility as determined by health status. The classifying was done by the examining physician according to agreed standards." (p. 31)

The most frequent defect was untreated dental caries, 84 out of every 100 examined needing attention. About 19 per cent of the youth examined needed correction of eye defects and tonsillectomies.

This exhaustive study concludes that nine-tenths of the low income group of youths examined needed medical and dental care and that one-third of them were unfit for certain kinds of productive work on account of health defects.

RICHARD A. BOLT

BOOKS RECEIVED

ALLERGY. By Erich Urbach. New York: Grune & Stratton, 1943. 1100 pp. Price \$12.00.

THE PRINCIPLES AND PRACTICE OF INDUSTRIAL MEDICINE. Fred J. Wampler, Editor. Baltimore: Williams & Wilkins, 1943. 579 pp. Price, \$6.00.

THE MODERN TREATMENT OF SYPHILIS. By Joseph Earle Moore. 2nd ed., 2nd ptg. Springfield: Thomas, 1943. 717 pp. Price, \$7.00.

ESSAYS IN BIOLOGY: IN HONOR OF HERBERT M. EVANS. Berkeley: University of California Press, 1943. 684 pp. Price, \$10.00.

MICROMERITICS: THE TECHNOLOGY OF FINE PARTICLES. By J. M. Dallavalle. New York: Pitman, 1943. 428 pp. Price, \$8.50.

THESE MYSTERIOUS RAYS. By Alan L. Hart. New York: Harper, 1943. 218 pp. Price, \$2.75.

RELAXATION. By Josephine L. Rathbone. New York: Teachers College, 1943. 157 pp. Price, \$1.75.

NUTRITION AND PHYSICAL FITNESS. By L. Jean Bogert. 4th ed. Philadelphia: Saunders, 1943. 500 pp. Price, \$3.00.

THE BOY SEX OFFENDER AND HIS LATER CAREER. By Lewis J. Doshay. New York: Grune & Stratton, 1943. 206 pp. Price, \$3.50.

HOSPITAL DISCHARGE STUDY. Vol. Two. By Neva R. Deardorff and Marta Fraenkel.

Welfare Council of New York City, 1943. 349 pp.

COLLECTED REPRINTS OF THE GRANTEES OF THE NATIONAL FOUNDATION FOR INFANTILE PARALYSIS, 1942. Vol. III. New York: National Foundation for Infantile Paralysis, 1943. 978 pp.

PLANNING FOR MARRIAGE. By William H. Morgan and Mildred I. Morgan. New York: Association Press, 1943. 85 pp. Price, \$.50.

CHINA'S HEALTH PROBLEMS. By Szeming Sze. Chinese Medical Association, Washington, D. C. 1943. 60 pp.

HANDBOOK OF TROPICAL MEDICINE. By Alfred C. Reed and J. C. Geiger. California: Stanford University Press, 1943. 188 pp. Price, \$1.50.

THE EPIDEMIOLOGY OF DIPHTHERIA DURING THE LAST FORTY YEARS. By W. T. Russell. London: His Majesty's Stationery Office, 1943. 52 pp. Price, \$.50.

CHILD DEVELOPMENT. By Marian E. Breckenridge and E. Lee Vincent. Philadelphia: Saunders, 1943. 592 pp. Price, \$3.00.

DRYING AND DEHYDRATION OF FOODS. By H. W. Von Loesbecke. New York: Reinhold, 1943. 302 pp. Price, \$4.25.

REHABILITATION OF THE TUBERCULOUS. By H. A. Pattison. Livingston, N. Y.: The Livingston Press, 1942. 186 pp. Price, \$2.50.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Have You Given Your Life-Saving Plasma?—From five to nine times as many wounded men are being saved in this war as in the last. Plasma, surgery, and sulfonamides—in that order—are the great lifesavers. Shout this from the housetops: and practise what you preach in the matter of blood donations.

ANON. The Decreased Death Rate in the Army from Wounds. *Science*. 97, 2529:10 (June 18), 1943.

Utopia, Inc.—Briefly presented are the main features of the "Americanized Beveridge plan" which propose to increase present social security coverage in old age and survivor's insurance benefits, disability payments, unemployment insurance, maternity benefits, and medical and hospital services, for 15 million more workers, their wives and children.

ANON. The Wagner-Murray-Dingell Social Security Plan. *J.A.M.A.* 122, 9:609 (June 26), 1943.

Chest X-rays Plus Allowances—Despite wartime difficulties the British Ministry of Health proposes to intensify tuberculosis prevention by extending mass miniature radiography and by granting allowances to persons undergoing treatment. Isn't it about time that we, in this wealthy country, also consider the second feature as a means of getting people to undergo care while there is still hope of successful treatment?

ANON. The Anti-Tuberculosis Campaign. *J. Roy. Inst. Pub. Health & Hyg.* 6, 6:131 (June), 1943.

Gonorrhea Is Still Much Too Prevalent—Last words in the fields of

gonorrhea prophylaxis, diagnosis, treatment, control of patients, criteria of cure, and case finding by a distinguished committee.

ANON. The Management of Gonorrhea in General Practice. *Ven. Dis. Inform.* 24, 5:127 (May), 1943.

Hard Workers Please Note—Medical students voluntarily subsisting upon a diet chiefly deficient in the vitamin B complex (but on a diet such as a third of all Americans subsist on)—developed irritability, easy fatigability, lack of pep, anorexia and increased leg pain during work periods, but at no time did they develop objective physical signs of B deficiency. All the changes returned to normal when a yeast concentrate was added to the diet.

BARBORKA, C. J., *et al.* Relationship between Vitamin B Complex Intake and Work Output in Trained Subjects. *J.A.M.A.* 122, 11:717 (July 10), 1943.

More Comfort for Confinees—Another of the several recent articles on continuous caudal anesthesia is called to your attention chiefly to remind you that many researchers are engaged in perfecting the method. Already more than a thousand births have been reported—the very great majority with relief to the mother, and all without effect upon the baby. Begins to look like the real article.

BLOCK, N., and ROTSTEIN, M. Continuous Drip Caudal Anesthesia in Obstetrics. *J.A.M.A.* 122, 9:582 (June 26), 1943.

Neglected Schick Test—Only a quarter of the previously immunized children were still Schick-positive by the time they reached a hospital for contagious diseases. (They were ad-

mitted for other conditions than diphtheria.) Of 88 children admitted with diphtheria, a third had been immunized but not checked previously. Schick tests should be done after routine immunizations, reasonably concludes the writer.

BULLOWA, J. G. M., and SCANNEL, M. The Efficiency of Inadequate-Antidiphtheria Immunization. J.A.M.A. 122, 9:595 (June 26), 1943.

In Preparation for Polio—During 1942 the incidence of poliomyelitis was relatively low. The states reporting largest numbers of cases were Illinois, New York, California, New Jersey, and Texas. Commenting upon the epidemiologic aspects of the disease, the writer deems it remarkable that, for all the time and effort spent upon the disease, so little new information has been produced. One can improve very little upon Frost's epidemiological discussion published in 1913, he points out.

DAUER, C. C. Poliomyelitis in the United States in 1942 and a Summary of Its Prevalence from 1933 to 1942 Inclusive. Pub. Health Rep. 58, 25:937 (June 18), 1943.

Publican Ideas of Sanitation—Health officers who have in their own communities taverns in which beer is dispensed in improperly sanitized glasses will read with feeling the trials of the British health officer (of Leicester) who found 55 instances in 273 "pubs"—of beer glasses being rinsed in cold water, *or in no water at all*. Several publicans were letting the "swipes" (overflow from glasses) drain back into the barrel.

MACDONALD, E. K., and YATES, J. Notes on Some Matters Connected with Beer Drinking. Pub. Health. 56, 9:106 (June), 1943.

Paper-of-the-Month—Inspiring report upon the United Nations' Conference on Food and Agriculture by one who took part in the deliberations: this state paper is on your "must" reading list, so you'll find no nubbin of

news here to help you guess what it's all about.

PARRAN, T. A Blueprint for the Conquest of Hunger. Pub. Health Rep. 58, 24:893 (June 11), 1943.

Practical Venereal Disease Control—Three dozen centers where venereally infected patients are given modern, intensified treatment, something useful to do, and an allowance for doing it: that, it would seem, is a prodigious step forward in stopping the spread of syphilis and gonorrhea. (Incidentally forty-one centers are "contemplated.")

PEARCE, D. Rapid Treatment Centers. Am. J. Nurs. 43, 7:658 (July), 1943.

Promise of Things To Come—Both bacteria and viruses apparently remain suspended in the air for considerable periods of time and in a viable state. Promising methods for the control of air-borne infections are being studied in an army hospital by a special commission on cross-infections.

ROBERTSON, O. H. Air-Borne Infections. Science. 97, 2527:495 (June 4), 1943.

Every Tumor Is an Induced Tumor—This scholarly discussion of the causes of cancer, especially the viruses, is not easy reading but you will be well repaid for your effort even though you probably will not know the exact meaning of half the technical terms (which you probably will not look up for you will promptly forget the definitions). Just the study of the table of relationships of neoplastic viruses and carcinogens to tumors will prove illuminating. If you do that much, you'll read the rest.

ROUS, P. The Nearer Causes of Cancer. J.A.M.A. 122, 9:573 (June 26), 1943.

Prevents as Well as Heals—Sulfaguanidine proved effective in stopping the spread of dysentery.

SCOTT, J. C. Prophylactic Use of Sulfaguanidine. J.A.M.A. 122, 9:588 (June 26), 1943.

What Army Blood Tests Reveal

—Consider these five pithy commentaries. Syphilis is essentially a disease of Negroes. Our white population enjoys a syphilis rate that compares favorably with any country in the world (including the Scandinavian). Among white men syphilis is a disease of the social outcast. Some health workers tend to gloss over the high prevalence of syphilis among Negroes in north and south, city and country. The sooner we recognize the true situation and get busy doing something about it, the better will be the nation's health.

SMILLIE, W. G. Syphilis in the United States Primarily a Negro Problem. J.A.M.A. 122, 6:365 (June 5), 1943.

Best We Have To Offer—Seven suggested don'ts and do's for parents, should poliomyelitis appear in epidemic form this fall.

STIMSON, P. M. Prevention of Infantile Poliomyelitis. J.A.M.A. 122, 11:764 (July 10), 1943.

"So David Prevailed over the Philistine, with a Sling"—In 46 state, county or city health departments 300 professional and clerical employees comprise the task-force set out to solve the whole nation's industrial hygiene problems that cause the loss of 500 million man days of labor. To mop up the flood of the 10 billions of dollars that sickness costs, just a few dollars over a million are being spent annually. What the valiant 46 units are attempting to do is reported upon.

TRASKO, V. M. Activities of State and Local Industrial Hygiene Services in a War Year. Pub. Health Rep. 58, 24:904 (June 11), 1943.

Sulfa Drug Stops Scarlet Fever—

In the face of a scarlet fever outbreak in a naval station, sulfadiazine effectively stopped the spread and reduced the number of daily sick calls due to other respiratory complaints.

WATSON, R. F., *et al.* Sulfadiazine Prophylaxis in an Epidemic of Scarlet Fever. J.A.M.A. 122, 11:730 (July 10), 1943.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND SEVENTY-SECOND ANNUAL BUSINESS MEETING

AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

Headquarters: Hotel Pennsylvania

RATES QUOTED BY NEW YORK HOTELS

*Wartime Public Health Conference and Seventy-second Annual
Business Meeting—October 12-14, 1943*

| | Rooms With Bath | |
|---|-----------------|--------------|
| | Single | Double |
| <i>Headquarters:</i> | | |
| Hotel Pennsylvania, 7th Avenue and 33rd Street | \$3.85- 8.80 | \$5.50- 9.90 |
| <i>Hotels near Hotel Pennsylvania:</i> | | |
| Governor Clinton, 31st Street and 7th Avenue | 3.30- 5.50 | 4.40- 7.70 |
| McAlpin, Broadway and 34th Street | 3.30- 6.60 | 4.95- 8.80 |
| New Yorker, 34th Street and 8th Avenue | 3.85- 8.80 | 5.50-11.00 |
| <i>Selected Hotels Outside Pennsylvania Zone:</i> | | |
| Ambassador, Park Avenue and 51st Street | 5.00- 8.00 | 7.00-10.00 |
| Astor, Broadway and 44th Street | 3.00- 5.00 | 5.00- 8.00 |
| Barbizon (Women), Lexington Avenue and 63rd Street | 3.00- 3.50 | 4.50- 5.50 |
| Biltmore, Madison Avenue and 43rd Street | 5.50-12.00 | 7.50-14.00 |
| Bristol, 129 West 48th Street | 2.50- 4.00 | 3.50- 6.00 |
| Commodore, Lexington Avenue and 42nd Street | 3.50- 5.50 | 5.50- 8.80 |
| Cornish Arms, 311 West 23rd Street | 2.25- 2.50 | 3.50- 4.00 |
| Fifth Avenue Hotel, 24 Fifth Avenue (9th Street) | 3.75- 5.00 | 5.00- 7.00 |
| George Washington, 23rd Street and Lexington Avenue | 2.00- 4.00 | 3.50- 6.00 |
| Lexington, 48th Street and Lexington Avenue | 4.00- 6.00 | 5.50- 8.00 |
| Lincoln, 8th Avenue and 44th Street | 3.00- 5.00 | 4.00- 8.00 |
| Midston House, 22 East 38th Street | 3.00- 3.25 | 4.00- 4.50 |
| New Weston, Madison Avenue and 50th Street | 4.00- 6.00 | 6.00- 9.00 |
| Paramount, 46th Street, West of Broadway | 2.50- 4.50 | 4.00- 8.00 |
| Park Central, 7th Avenue and 55th Street | 4.00- 5.00 | 6.00- 7.00 |
| Parkside, 18 Gramercy Park South | 2.50- 3.00 | 5.00 |
| Piccadilly, 227 West 45th Street | 2.50- 4.00 | 3.50- 6.00 |
| Prince George, 14 East 28th Street | 2.50- 4.00 | 3.50- 7.00 |
| Roosevelt, Madison Avenue and 45th Street | 4.50- 8.00 | 6.50-12.00 |
| St. Regis, Fifth Avenue and 55th Street | 6.00- 7.00 | 7.00-11.00 |
| Seymour, 50 West 45th Street | 4.00- 5.00 | 5.50- 6.00 |
| Shelton, 49th Street and Lexington Avenue | 3.50- 5.00 | 5.00- 7.00 |
| Waldorf-Astoria, 50th Street and Park Avenue | 7.00-10.00 | 10.00-15.00 |
| Wellington, 7th Avenue and 55th Street | 2.50- 4.00 | 3.50- 6.00 |

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The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

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 Mordy A. Elstein, M.D., Delta County Health
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Grace M. Lawrence, R.N., 219 Commonwealth Ave., Chestnut Hill, Mass., Supervisor of Public Health Nursing, Newton Health Dept.

Bessie K. Littman, R.N., P. O. Box 360, San Luis Obispo, Calif., Supervising Nurse, San Luis Obispo County Health Dept.

Susie M. Rice, R.N., Mountain City, Tenn., Jr. Public Health Nurse, State Dept. of Public Health

Epidemiology Section

Lieut. Ernest W. Ekermeier, M.C., 458 West College Ave., Tallahassee, Fla., Epidemiologist, U. S. Naval Reserve

Lieut. Edward R. Garvin, M.C., 1609 Gilbert Rd., Toledo, Ohio, Epidemiologist, U. S. Navy

Ella T. Robeson, M.D., 34 South St., Middletown, N. Y., Apprentice Epidemiologist, State Dept. of Health

Robert L. Yeager, M.D., Summit Park Sanatorium, Pomona, N. Y., Medical Director

School Health Section

Helen M. Edge, 3517 Main St., Kansas City, Mo., Director, Social Service Div., City Health Dept.

Hilda Ratner, M.D., 31-31 54th St., Woodside, L. I., N. Y., Supervisor of School Physicians, New York City Health Dept.

Unaffiliated

Gloria H. Cheplin, Yale School of Medicine, Dept. of Public Health, New Haven, Conn., Student

Thomas L. Hagan, D.D.S., 1307 Pere Marquette Bldg., New Orleans, La., Dental Surgeon, U. S. Public Health Service Dist. No. 4

Edward K. Steinkopff, M.D., 1537 W. Jackson St., Springfield, Ill., Chief, Div. of Tuberculosis Control, State Dept. of Public Health

D. Bruce Wilson, M.D., D.P.H., 5 Riverside Crescent, Toronto, Ontario, Canada, Field Staff Member, International Health Division, Rockefeller Foundation

APPLICANTS FOR FELLOWSHIP

In accordance with the By-laws of the Association, the names of applicants for Fellowship are officially published herewith. They have requested affiliation with the Sections indicated. Action by the various Section Councils, the Committee on Eligibility, and the Governing Council will take place at the Wartime Conference.

Health Officers Section

- Franklyn B. Amos, M.D., M.S.P.H., Assistant Director of Local Health Administration, State Department of Health, Albany, N. Y.
 Daniel Bergsma, M.D., Chief, Bureau of Venereal Disease Control, State Dept. of Health, Trenton, N. J. (Major, M.C., U.S.A.)
 Charles A. Kientz, Jr., Health Officer, North Arlington, N. J.
 Edward R. Krumbiegel, M.D., Commissioner of Health, Milwaukee, Wis.
 Carl N. Neupert, M.D., M.S.P.H., State Health Officer, Madison, Wis.
 William M. Smith, M.D., M.P.H., Assistant District Health Officer, State Health Dept., Albany, N. Y. (Capt., M.C., U.S.A.)
 Mary Steichen, M.D., M.S.P.H., Consultant in Public Health Practice, American Public Health Assn., New York, N. Y.
 Wilmier M. Talbert, M.D., M.S.P.H., District Health Superintendent, State Dept. of Public Health, Decatur, Ill. (Lt. Comdr., U.S.N.R.)
 Alexander Witkow, M.D., M.P.H., Director, Dickinson County Health Dept., Iron Mountain, Mich.

Laboratory Section

- G. D. W. Cameron, M.D., D.P.H., Chief, Laboratory of Hygiene, Dominion Dept. of Health, Ottawa, Ont.
 Orren D. Chapman, M.D., Director of Laboratory, Department of Health, Syracuse, N. Y.
 Ward H. Cook, M.D., Director, Bureau of Laboratories, Dept. of Health, Yonkers, N. Y.
 Gordon E. Davis, Sc.D., Senior Bacteriologist, U. S. Public Health Service, Hamilton, Mont. (Capt., Sn.C., A.U.S.)
 William J. Deadman, M.B., City Bacteriologist, City Health Dept., Hamilton, Ont.
 Claude E. Dolman, M.B., D.P.H., Director, Division of Laboratories, Provincial Board of Health, Vancouver, B. C.
 George F. Forster, Ph.D., Assistant Chief, Division of Laboratories, State Dept. of Health, Chicago, Ill.
 R. J. Gibbons, M.D., D.P.H., Assistant Chief, Laboratory of Hygiene, Dominion Dept. of Health, Ottawa, Ont.
 Bettylee Hampil, Sc.D., Head of Virus Dept., Medical Research Division, Sharp & Dohme, Inc., Philadelphia, Pa.

- Margaret W. Higginbotham, Sc.D., Bacteriologist and Serologist, State Dept. of Health, Minneapolis, Minn.
 Cyril K. Johns, Ph.D., Associate Bacteriologist, Division of Bacteriology and Dairy Research, Dominion Dept. of Agriculture, Ottawa, Ont.
 Col. Dwight M. Kuhns, M.C., Commanding Officer, Fourth Service Command Laboratory, Fort McPherson, Ga.
 Edith Kuhns, B.S., Director, Hygienic Laboratory, State Board of Health, Helena, Mont.
 Donald J. Mackenzie, M.D., C.M., Director of Laboratories, Provincial Department of Public Health, Halifax, N. S.
 J. Howard Mueller, Ph.D., Professor of Bacteriology and Immunology, Harvard Medical School, Boston, Mass.
 Ruth M. Myers, M.S., Associate Bacteriologist, State Department of Health, Baltimore, Md.
 Nathan Nagle, A.B., Bacteriologist-in-charge, Chicago Branch Laboratory, State Dept. of Health, Chicago, Ill.
 Elizabeth I. Petran, Ph.D., Senior Bacteriologist, State Dept. of Health, Baltimore, Md.
 Percy M. Phelps, Dr.P.H., Sanitary Bacteriologist, Bureau of Laboratories, Western Michigan Division, State Dept. of Health, Grand Rapids, Mich.
 Norman J. Pyle, V.M.D., Assistant Director, Veterinary Division, Lederle Laboratories, Inc., Pearl River, N. Y. (Major, U.S.A.)
 Clara Raven, M.D., Pathologist and Director of Laboratory, Scranton State Hospital, Scranton, Pa. (Capt., M.C., A.U.S.)
 James D. Reid, Sc.D., Associate Professor, Dept. of Bacteriology, and Supervisor of Bacteriology Laboratories-Hospitals, Medical College of Virginia, Richmond, Va.
 Morris F. Shaffer, Ph.D., Senior Bacteriologist, Massachusetts Antitoxin and Vaccine Laboratory, Jamaica Plain, Mass.
 Major Edgar J. Staff, Sn.C., A.U.S., Officer in Charge, Dept. of Bacteriology, 1st Service Command Laboratory, Jamaica Plain, Mass.
 William A. Starin, Ph.D., Professor of Bacteriology, Ohio State University, Columbus, Ohio
 Lyon P. Streat, Ph.D., D.D.S., Bacteriologist-in-charge, Ayerst, McKenna & Harrison, Ltd., Montreal, Que.
 Charles A. Stuart, Ph.D., Associate Professor,

- Arnold Laboratory, Brown University, Providence, R. I.
- Earl J. Sunkes, D.P.H., Assistant Director of Laboratories, State Dept. of Public Health, Atlanta, Ga.
- William H. Swartzendruber, B.A., Coördinating Bacteriologist, State Department of Public Health, Springfield, Ill.
- Anna I. van Saun, Director, Division of Laboratories, Board of Health, Paterson, N. J.
- Harriette D. Vera, Ph.D., Bacteriologist, Baltimore Biological Laboratory, Baltimore, Md.
- Kenneth M. Wheeler, Ph.D., Research Microbiologist, State Health Dept., Hartford, Conn.
- Lieut. Edwin O. Wicks, A.U.S., Chief, Venereal Disease Section, Fourth Service Command Laboratory, Ft. McPherson, Ga.
- Arthur W. Wright, M.D., Professor of Pathology and Bacteriology, Albany Medical College, and Pathologist and Bacteriologist-in-Chief, Albany Hospital, Albany, N. Y.

Vital Statistics Section

- John W. Fertig, Ph.D., Professor of Biostatistics, DeLamar Institute of Public Health, Columbia University, New York, N. Y.

Engineering Section

- Gerald E. Arnold, C.E., Sanitary Engineer (R), U. S. Public Health Service, San Francisco, Calif.
- Leonard M. Board, C.E., Director of Sanitation Division, St. Louis County Health Dept., Clayton, Mo.
- Herbert M. Bosch, M.P.H., Public Health Engineer, State Dept. of Health, Minneapolis, Minn. (Major, Sn.C., U.S.A.)
- J. Matt Carr, M.S., Sanitary Engineer, State Dept. of Health, Linden, Tex. (Capt., Sn.C., U.S.A.)
- Lloyd K. Clark, S.B., Director, Division of Sanitary Engineering, State Health Dept., Bismarck, N. D. (Major, Sn.C., U.S.A.)
- Charles M. Davidson, B.S.C.E., Sanitary Engineer, Louisville and Jefferson County Health Dept., Louisville, Ky.
- Samuel M. Ellsworth, B.S., Consulting Engineer, and Lecturer, Harvard Graduate School of Engineering, Boston, Mass.
- Herbert B. Foote, C.E., Director, Division of Water and Sewage, State Board of Health, Helena, Mont.
- Harold B. Gotaas, M.S.C.E., Sc.D., Chief of Engineering Section, Division of Health and Sanitation, Office of Coordinator of Inter-American Affairs, Washington, D. C. (Major, Sn.C.)

- Carl D. Gross, M.S., Principal Sanitary Engineer, State Health Department, Springfield, Ill.
- Herbert H. Hasson, B.S., Engineering Director, W. K. Kellogg Foundation, Battle Creek, Mich.
- Chauncey A. Hyatt, Consultant on Swimming Pool Sanitation, State Dept. of Public Health, Chicago, Ill.
- James M. Jarrett, B.S.C.E., P.A. Sanitary Engineer (R), U. S. Public Health Service, Norfolk, Va.
- Francis W. Kittrell, M.S., Associate Sanitary Engineer, Tennessee Valley Authority, Florence, Ala.
- Clarence W. Klassen, B.S.C.E., Chief Sanitary Engineer, State Dept. of Public Health, Springfield, Ill.
- William H. Larkin, C.E., Senior Sanitary Engineer, State Dept. of Health, New York, N. Y.
- Maurice LeBosquet, Jr., M.S., Senior Public Health Engineer, Office of Stream Sanitation, U. S. Public Health Service, Cincinnati, Ohio
- David B. Lee, M.S.S.E., Chief Sanitary Engineer, State Health Dept., Jacksonville, Fla. (Capt., Sn.C., U.S.A.)
- John A. Logan, D.Sc., Chief Engineer, Russell & Axon, St. Louis, Mo.
- Alan C. Love, M.S.S.E., Sanitary Engineer, McLennan County Health Unit, Waco, Tex.
- Franz J. Maier, B.S.C.E., P. A. Sanitary Engineer, U. S. Public Health Service, New York, N. Y.
- Milton M. Miller, M.S., Milk Specialist, U. S. Public Health Service, Washington, D. C.
- Emanuel H. Pearl, M.S.E., Assistant Public Health Engineer, Ohio River Pollution Survey, U. S. Public Health Service, Washington, D. C. (Lieut., Corps of Engineers, U.S.A.)
- Major Harley M. Riley, Sn.C., U.S.A., Assistant Chief, Sanitation Branch, Medical Division, Fort Bragg, N. C.
- Charles L. Senn, B.S.C.E., Director, Sanitation Section, City Health Dept., Los Angeles, Calif.
- L. Glen Shields, M.S., Associate Sanitary Engineer, Dept. of Buildings and Safety, Detroit, Mich.
- Chester A. Smith, B.S.C.E., Associate Engineer, Burns & McDonnell Engineering Co., Kansas City, Mo.
- W. Brewster Snow, M.S., Acting Associate Professor of Sanitary Engineering, School of Public Health, University of North Carolina, Chapel Hill, N. C.
- Frank M. Stead, M.S., Industrial Hygiene Engineer, Los Angeles County Health Dept., Los Angeles, Calif.

James H. Stephens, M.S., Senior Sanitary Engineer, State Board of Health, Columbia, S. C.

Dick C. Thompson, B.E., Sanitary Engineer, Davidson County Health Dept., Nashville, Tenn.

Clarence J. Velz, C.E., Water Consultant, Region No. 2, National Resources Planning Board, New York, N. Y.

W. Wallace White, C.P.H., Director, Division of Public Health Engineering, State Health Dept., Reno, Nev.

Ben L. Williamson, M.S., Assistant Engineer, State Health Dept., Des Moines, Iowa

Joseph A. Willman, M.S., Public Health Engineer, Muscogee County Health Dept., Columbus, Ga.

Lewis A. Young, M.S., Associate Chief Engineer, Division of Health and Sanitation, Office of Coordinator of Inter-American Affairs, Bogota, Colombia (Capt., Sn.C., A.U.S.)

Industrial Hygiene Section

Joseph C. Aub, M.D., Physician, Massachusetts General Hospital and Professor in Research Medicine, Harvard Medical School, Boston, Mass.

Heinrich Brieger, M.D., Teacher of Public Health and Preventive Medicine, Hahnemann Medical College, Philadelphia, Pa.

Hugh P. Brinton, Ph.D., Statistician, U. S. Public Health Service, Washington, D. C.

John F. Cadden, M.D., M.P.H., Industrial Physician, American Viscose Corp., Roanoke, Va.

Robert H. Flinn, M.D., Surgeon, U. S. Public Health Service, Safety & Security Branch, Office of Chief of Ordnance, War Department, Chicago, Ill.

William G. Fredrick, Sc.D., Assistant Industrial Hygienist and Chief Chemist, Bureau of Industrial Hygiene, Department of Health, Detroit, Mich.

Lydia G. Giberson, M.D., C.M., Industrial Psychiatrist, Metropolitan Life Insurance Company, New York, N. Y.

Lyman D. Heacock, D.D.S., M.P.H., Dental Consultant, Division of Industrial Hygiene, U. S. Public Health Service, Bethesda, Md.

Lemuel C. McGee, M.D., Ph.D., Medical Director, Hercules Powder Co., Wilmington, Del.

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A. Victor Nasatir, M.D., M.S.P.H., Director of Industrial Hygiene, City Health Dept., Los Angeles, Calif. (Capt., M.C., A.U.S.)

Frank A. Patty, B.S., Director of Industrial

Hygiene, Fidelity & Casualty Co. of New York, New York, N. Y.

O. A. Sander, M.D., In Private Practice in Industrial Field, Milwaukee, Wis.

Alfred N. Setterlind, M.S., Chief Chemist, Division of Industrial Hygiene, State Dept. of Public Health, Chicago, Ill.

Joseph Shilen, M.D., Director, Bureau of Industrial Hygiene, State Department of Health, Harrisburg, Pa.

Emil A. Steiner, M.D., M.P.H., Industrial Toxicologist, Haskell Laboratory of Industrial Toxicology, Du Pont Experimental Station, Wilmington, Del.

James H. Sterner, M.D., Director, Laboratory of Industrial Medicine, Eastman Kodak Co., Rochester, N. Y.

Major Leon H. Warren, M.C., U.S.A., Assistant, Research Coördinating Branch, Plans Division, Office of the Surgeon General, War Department, Washington, D. C.

John J. Wittmer, M.D., Director, Medical and Personnel Departments, Consolidated Edison Company of New York, Inc., New York, N. Y.

McIver Woody, M.D., Head of Medical Dept., Standard Oil Company of New Jersey, New York, N. Y.

Food and Nutrition Section

C. Olin Ball, Ph.D., Technical Director, Owens-Illinois Can Co., Toledo, Ohio

Adelia M. Beeuwkes, M.S., Instructor in Nutrition, University of Michigan, Ann Arbor, Mich.

Florence H. Case, B.S., Nutrition Consultant, State Dept. of Health, Providence, R. I.

Ruth C. Clouse, Ph.D., Chairman, Dept. of Home Economics and Professor of Nutrition, Illinois Institute of Technology, Chicago, Ill.

James E. Fuller, Ph.D., Research Professor of Bacteriology, Massachusetts State College and Experiment Station, Amherst, Mass.

Robert S. Harris, Ph.D., Director, Nutritional Biochemistry Laboratories, Massachusetts Institute of Technology, Cambridge, Mass.

Raymond Hertwig, B.S., Scientific Consultant, The Borden Co., New York, N. Y.

Bertha Holman, Nutritionist, East Harlem Dental and Nutrition Service, Community Service Society, New York, N. Y.

Bernice Hopper, M.S., Principal Nutritionist, State Dept. of Public Health, Nashville, Tenn.

Helen A. Hunscher, Ph.D., Professor and Head, Home Economics Dept., Western Reserve University, Cleveland, Ohio

Ruth M. Kahn, M.S., Chief of Food Clinic,

Washington University Clinic, St. Louis, Mo.

Emanuel Kaplan, Sc.D., Chief, Division of Chemistry, City Health Dept., Baltimore, Md.

Milton L. Laing, M.S., Chief Chemist, Armour & Co., Chicago, Ill.

Louis Lang, M.A., Chief Chemist, National Sugar Refining Co., Long Island City, N. Y.

Ethel A. Martin, M.S., Director of Nutrition Service, National Dairy Council, and Lecturer in Home Economics, University of Chicago, Chicago, Ill.

Roe E. Remington, Ph.D., Professor of Nutrition, Medical College of South Carolina, Charleston, S. C.

Grace H. Sanders, M.S., Director, Division of Health Education, Knoxville-Knox County Health Dept., Knoxville, Tenn.

Jane Sedgwick, B.S., Nutrition Consultant, Bureau of Maternal and Child Health, State Dept. of Public Health, San Francisco, Calif.

Helen R. Stacey, M.A., Specialist in Nutrition, Children's Bureau, Washington, D. C.

Maternal and Child Health Section

William L. Hughes, Ph.D., Acting Chairman, Dept. of Health, Physical Education and Recreation, Teachers College, Columbia University, New York, N. Y.

Betty Huse, M.D., Regional Medical Consultant, Children's Bureau, Washington, D. C.

Emory W. Morris, D.D.S., General Director and Treasurer, W. K. Kellogg Foundation, Battle Creek, Mich.

Ruth J. Raattama, M.D., M.P.H., Director of Maternal and Child Health and Crippled Children, State Department of Health, Boise, Idaho

William M. Schmidt, M.D., Regional Medical Consultant, Children's Bureau, Washington, D. C.

Susan P. Souther, M.D., M.P.H., Chief, Division of Child Hygiene, State Dept. of Health, Columbus, Ohio

Public Health Education Section

C. K. Chu, M.D., Dr.P.H., Director, National Institute of Health, Chungking, China

John E. Farrell, B.A., Executive Secretary, Rhode Island Medical Society, Providence, R. I.

Fay M. Hemphill, M.S.P.H., Health Education Specialist, U. S. Public Health Service, Bethesda, Md.

Rae E. Kaufert, B.S., Assistant Health Education Consultant, U. S. Public Health Service, Washington, D. C.

Alice H. Miller, C.P.H., Associate Health Education Consultant, U. S. Public Health Service, Washington, D. C.

Eunice N. Tyler, C.P.H., Associate Health Education Consultant, U. S. Public Health Service, Washington, D. C.

Epidemiology Section

Nicholas P. Cosco, M.D., Health Officer, Middletown, N. Y.

Herman C. Mason, Ph.D., Associate Professor, Dept. of Bacteriology and Immunology, University of North Carolina, Chapel Hill, N. C.

Unaffiliated

Oswald N. Andersen, M.D., Director, School of Health and Professor of Hygiene, Stanford University, Calif.

Kenneth A. Easlick, D.D.S., Associate Professor, School of Dentistry and School of Public Health, University of Michigan, Ann Arbor, Mich.

Lester A. Gerlach, D.D.S., Dental Director, Health Dept., Milwaukee, Wis.

Allen O. Gruebbel, D.D.S., M.P.H., Director, Dental Division, State Board of Health, Jefferson City, Mo.

Albert D. Kaiser, M.D., Consulting Pediatrician, State Department of Health, and Associate Professor of Pediatrics, University of Rochester Medical School, Rochester, N. Y.

George A. Nevitt, D.D.S., M.S.P.H., P. A. Dental Surgeon (R), U. S. Public Health Service, New York, N. Y.

Walter J. Pelton, D.D.S., M.S.P.H., P. A. Dental Surgeon, U. S. Public Health Service, Washington, D. C.

C. Morley Sellery, M.D., Director, Health Service Section, Los Angeles City Schools, Los Angeles, Calif.

Col. James S. Simmons, M.C., Chief, Preventive Medicine Division, Office of the Surgeon General, U. S. Army, Washington, D. C.

Clifford R. Taylor, D.D.S., M.S.P.H., Assistant Director, Bureau of Public Health Dentistry, State Dept. of Health, Lansing, Mich.

DECEASED MEMBERS

ALICE G. BRYANT, M.D., Boston, Mass., Elected Member 1921, Elected Fellow 1923, Engineering Section

JOHN W. ELDER, M.D., Albuquerque, N. M., Elected Member 1940, Health Officers Section

HARRY B. MELLER, Pittsburgh, Pa., Elected Member 1930, Engineering Section

FRANK C. RAINIER, Whittier, Calif., Elected Member 1940, Laboratory Section

**Preliminary Program of the Scientific Sessions of
the Wartime Public Health Conference and the
72nd Annual Business Meeting of the American
Public Health Association, and Meetings of
Related Organizations**

New York, N. Y.

October 11, 12, 13, and 14, 1943

HOTEL PENNSYLVANIA

THE Annual Meeting Program Committee offers a preview of the content of scientific sessions planned in connection with the Wartime Conference and the 72nd Annual Business Meeting in New York, N. Y. In many instances, sessions are complete. In others, places are purposely left open for important matters which may develop before October. Inaccuracies and omissions are to be expected, and it is hoped they will be excused. The professional affiliations and addresses of speakers are not given, but a complete index to participants will be published in the final program, which will be distributed to all delegates at the Registration Desk, Hotel Pennsylvania. Registration headquarters will be opened at 9:30 A.M. on Monday, October 11.

MONDAY MEETINGS

**AMERICAN PUBLIC HEALTH ASSOCIATION
GOVERNING COUNCIL**

2:30 P.M. First Meeting—Parlor 2.

AMERICAN SCHOOL HEALTH ASSOCIATION

2:30 P.M. First General Session—Salle Moderne.

Presiding: CLAIR E. TURNER, DR.P.H., President.

TODAY'S PROBLEMS IN SCHOOL HEALTH EXAMINATIONS

Panel Leader: HAROLD H. MITCHELL, M.D.

Panel:

ARTHUR R. TURNER, M.D.
C. MORLEY SELLERY, M.D.
WILLIAM E. AYLING, M.D.
GEORGE M. WHEATLEY, M.D.

MONDAY MEETINGS (Cont.)

AMERICAN SCHOOL HEALTH (Cont.)

8:30 P.M. *Second General Session—Salle Moderne.*

Presiding: CLAIR E. TURNER, DR.P.H., *President.*

Report of the Massachusetts Vision Test Study. LURA OAK, PH.D.

Dental Caries Control in School Children. FRANCES KRASNOW, PH.D.

Discussion. WILSON G. SMILLIE, M.D., and E. C. McBEATH, D.D.S.

Citations for Distinguished Service.

AMERICAN SOCIAL HYGIENE ASSOCIATION

8:30 P.M. *Roof Garden.*

CANCER SYMPOSIUM COMMITTEE

Presiding: THOMAS J. DUFFIELD.

SYMPOSIUM ON CANCER CONTROL

10:00 A.M. *Georgian Room.*

EPIDEMIOLOGY

Round Table Discussion

Cancer Research

Epidemiology

Reporting of Cancer Cases in New York State

Symposium Participants

CLARENCE C. LITTLE, SC.D.

THOMAS J. DUFFIELD

MORTON L. LEVIN, M.D.

12:30 P.M. *Luncheon Meeting, Hotel McAlpin.*

ADMINISTRATION

State and Federal Cancer Program JAMES W. HAWKINS, M.D.
County Cancer Program J. LOUIS NEFF

Round Table Discussion

Symposium Participants

2:30 P.M. *Georgian Room.*

SERVICE TO CANCER PATIENTS—CLINICS, HOSPITALS, ETC.

Round Table Discussion

Symposium Participants

The State-wide Cancer Record Registry in Connecticut ELEANOR J. MACDONALD

Results of Treatment HAYES MARTIN, M.D.

The Needs of the Terminal Cancer Patients in Massachusetts HILDA LARROCCA

MONDAY MEETINGS (Cont.)

CANCER SYMPOSIUM COMMITTEE (Cont.)

8:00 P.M. Georgian Room.

CANCER EDUCATION

Round Table Discussion

Education in Cancer
Evaluation of Educational Program
in Massachusetts
The Educational Program of the
American Society for the Con-
trol of Cancer

Symposium Participants

CLAIR E. TURNER, DR.P.H.
HERBERT L. LOMBARD, M.D., MIL-
DRED TULLY, and EVELYN POTTER
HERMAN C. PITTS, M.D.

Symposium Participants

MILLARD KNOWLTON, M.D.
CHARLES L. LARKIN, M.D.
W. J. MURPHY, M.D.
RAYMOND V. BROKAW, M.D.
EDMUND ZIMMERER, M.D.
HERBERT R. KOBES, M.D.
MORTIMER WARREN, M.D.

CHANNING C. SIMMONS, M.D.
FRANK L. RECTOR, M.D.
LAUREN V. ACKERMAN, M.D.
GEORGE C. WILKINS, M.D.
LOUIS C. KRESS, M.D.
MRS. LEA M. FARRELL
GEORGE S. T. PEEPLES, M.D.
CLARENCE F. BALL, M.D.

CONFERENCE OF STATE AND PROVINCIAL PUBLIC
HEALTH LABORATORY DIRECTORS

9:30 A.M. Conference Room 2.

2:30 P.M. Conference Room 2.

CONFERENCE OF STATE SANITARY ENGINEERS

9:30 A.M. Parlor 1.

2:30 P.M. Parlor 1.

CONFERENCE OF TEACHERS OF PREVENTIVE
MEDICINE

11:00 A.M. Parlor 2.

2:30 P.M. Keystone Room.

INTER-AMERICAN CONFERENCE ON HEALTH
EDUCATION

9:30 A.M. Parlor B.

2:30 P.M. Parlor B.

SESSIONS FROM TUESDAY, OCTOBER 12, TO THURSDAY, OCTOBER 14, INCLUSIVE .

TUESDAY, 9:30 A.M.

HEALTH OFFICERS

First Session—Ball Room

Presiding: MALCOLM R. BOW, M.D., *Chairman.*

Section Business.

Present Status of Knowledge Concerning Etiology of Cancer. CORNELIUS P. RHOADS, M.D.

The Epidemiology of Cancer—From the Viewpoint of the Health Officer. MORTON L. LEVIN, M.D.

Results in Breast Cancer Therapy Applied to Control Programs. JAMES W. HAWKINS, M.D.

Primary Atypical Pneumonia. JOHN H. DINGLE, M.D.

LABORATORY

First Session—Roof Garden

Presiding: PEARL L. KENDRICK, Sc.D., *Chairman.*

Section Business.

Report of the Coördinating Committee on Standard Methods. *Chairman,* LIEUTENANT COLONEL A. PARKER HITCHENS, M.C.

Report of the Standard Methods Committee on Diagnostic Procedures and Reagents. *Chairman,* WILLIAM D. STOVALL, M.D.

Report of the Standard Methods Committee on Virus and Rickettsial Diseases. *Chairman,* THOMAS FRANCIS, JR., M.D.

Report of the Standard Methods Committee on Examination of Water and Sewage. *Chairman,* WALTER L. MALLMANN, Ph.D.

Report of the Standard Methods Committee on Examination of Milk and Milk Products. *Chairman,* ROBERT S. BREED, Ph.D.

Report of the Standard Methods Committee on Biology of the Laboratory Animal. *Chairman,* BRIGADIER GENERAL RAYMOND A. KELSER.

Report of the Standard Methods Committee for Frozen Desserts and Ingredients. *Chairman,* FRIEND LEE MICKLE, Sc.D.

Report of the Standard Methods Committee on Biological Products. *Acting Chairman,* HAROLD W. LYALL, Ph.D.

Report of the Standard Methods Committee for the Examination of Shellfish. *Chairman,* JAMES GIBBARD.

Report of the Standard Methods Committee for the Examination of Germicides and Antibacterial Agents. *Chairman,* STUART MUDD, M.D.

Report of the Laboratory Section Representative on the Commission for the Study of Biological Stains. *Chairman,* WILLIAM D. STOVALL, M.D.

TUESDAY, 9:30 A.M.

LABORATORY (Cont.)

Report of the Section Archivist. *Chairman*, AUGUSTUS B. WADSWORTH, M.D.

Antibiotic Substances, Production by Microorganisms, Nature and Mode of Action. SELMAN A. WAKSMAN, PH.D.

The Rôle of the Public Health Laboratory in Gas Defense. EUGENE W. SCOTT, PH.D.

The Problem of Biologic Nonspecific Reactions in the Serology of Syphilis. JOHN A. KOLMER, M.D.

Discussion. JOHN F. MAHONEY, M.D.

ENGINEERING SECTION, CONFERENCE OF STATE
SANITARY ENGINEERS, AND CONFERENCE OF
MUNICIPAL PUBLIC HEALTH ENGINEERS

Joint Session—Madhattan Room

Presiding: A. H. WIETERS and W. SCOTT JOHNSON.

Report of the Committee on Industrial Sanitation. *Chairman*, W. SCOTT JOHNSON.

Report of the Committee on Municipal Public Health Engineering. *Chairman*, SOL PINCUS, C.E.

Report of the Committee on Sewage Disposal. *Chairman*, LANGDON PEARSE.

Report of the Committee on Shellfish. *Chairman*, L. M. FISHER, C.E.

Some Results of Swimming Pool Disinfection with Bromine. CHAUNCEY A. HYATT, and EDWARD A. PISZCZEK, M.D.

FOOD AND NUTRITION

First Session—Parlor 1

Presiding: IRA A. MANVILLE, M.D., *Chairman*.

NUTRITIVE VALUE OF PRESERVED FOODS

Nutritive Value of Canned Vegetables and Fruits. JAMES F. FEASTER, PH.D.

Effect of Preparation for Freezing, Freezing and Storage on the Vitamin Content of Vegetables. JENNY MCINTOSH, PH.D.

Effect of Dehydration on Vitamin Content of Vegetables. JAMES C. MOYER, PH.D.

Nutritive Value of Brined and Fermented Vegetables. IVAN D. JONES, PH.D., and JOHN L. ETCHHELLS, PH.D.

Nutritive Value of Canned and Dehydrated Meat and Meat Products. E. E. RICE, PH.D.

The Decrease of Vitamin C in Evaporated Milk and Means of Preventing It. F. J. DOAN, and D. V. JOSEPHSON.

TUESDAY, 9:30 A.M.

FOOD AND NUTRITION (Cont.)

Section Business.

Report of the Secretary. MARIETTA EICHELBERGER, PH.D.

Report of the Coördinating Committee. *Chairman*, F. C. BLANCK, PH.D.

Microbiological Examination of Meat and Cereal Products. (Report of the Committee on Microbiological Examination of Foods.) *Chairman*, HARRY E. GORESLINE, PH.D.

The Growth of Nutrition as a Science. (Report of the Committee on Nutritional Problems.) *Chairman* C. G. KING, PH.D.

Food Conservation. (Report of the Committee on Foods.) *Chairman*, BERNARD E. PROCTOR, PH.D.

Report of the Joint Committee on Analyzing Frozen Desserts. *Chairman*, FREDERICK W. FABIAN, PH.D.

Changes in Trends in the Dairy Industry as a Result of the War. (Report of the Committee on Milk and Dairy Products.) *Chairman*, J. A. KEENAN, PH.D.

Report of the Committee on Food Utensil Sanitation. *Chairman*, GEORGE J. HUCKER, PH.D.

Status of the Members of the B. Complex. (Report of the Committee on Assay of Foods.) *Chairman*, HENRY T. SCOTT, PH.D.

Report of the Committee on Membership and Fellowship. *Chairman*, RACHAEL REED.

Election of Officers.

Note: There will be a meeting of the Section Council immediately following this session.

PUBLIC HEALTH EDUCATION

First Session—Salle Moderne

Presiding: EDNA A. GERKEN, *Chairman*.

DISCOVERY OF NEW RESOURCES FOR HEALTH EDUCATION
IN WARTIME

Chairman: HELEN MARTIKAINEN.

The Use of Volunteers. MARY P. CONNOLLY.

Preparing High School Students for Community Service. GRAHAM L. DAVIS.

The OCD Block Plan. HOWARD Y. MCCLUSKY, PH.D.

Health Education in Japanese Relocation Camps. SALLY LUCAS JEAN.

Resources of Industry for Health Education. HOMER N. CALVER.

Discussion. CARL A. WILZBACH, M.D., and KENNETH D. WIDDEMER.

Section Business.

TUESDAY, 9:30 A.M.

PUBLIC HEALTH NURSING

*First Session—Georgian Room**Presiding: ELLA E. McNEIL, R.N., Chairman.**Section Business.*SIGNIFICANCE OF TODAY'S EXPERIENCES FOR FUTURE PUBLIC
HEALTH NURSING PRACTICE

Scope of Service. Speaker to be announced.

Personnel—Education and Accreditation. Speaker to be announced.

Administration of Public Health Nursing Services. Speaker to be announced.

Summary. Speaker to be announced

EPIDEMIOLOGY

*First Session—Parlor 2**Presiding: ERNEST L. STEBBINS, M.D., Chairman**Section Business.*The Problem of Rickettsial Diseases Among the Armed Forces.
COLONEL EDGAR ERSKINE HUME, M.C.Endemic Typhus in the United States. LIEUTENANT COLONEL HARRY E.
WRIGHT, M.C.Streptococcal Infections in a Naval Training Station. LIEUTENANT COM-
MANDER F. F. SCHWENTKER, M.C.Staphylococcus and Streptococcus Carriers—Sources of Food-borne
Outbreaks in War Industries. V. A. GETTING, M.D., A. D. RUBEN-
STEIN, M.D., and G. E. FOLEY.The Problem of Control of Tuberculosis in Mental Hospitals with
Reduced Personnel. ROBERT E. PLUNKETT, M.D.Present and Post-war Health Problems in Connection with Parasitic
Diseases. W. H. WRIGHT, M.D.*Section Business.*

TUESDAY, 9:30 A.M. AND 2:30 P.M.

**FOOD AND NUTRITION AND SCHOOL HEALTH SECTIONS,
AND AMERICAN SCHOOL HEALTH ASSOCIATION**

Joint Session

Presiding: LEONA BAUMGARTNER, M.D., and C. MORLEY SELLERY, M.D.

**WORKSHOP ON ADJUSTMENTS OF SCHOOL HEALTH PERSONNEL
IN WARTIME**

Rural Group A—Conference Room 3

Leader: MAYHEW DERRYBERRY, PH.D.

Recorder: RUTH E. GROUT, PH.D.

Consultants:

HUGH B. ROBINS, M.D.
JESSIE M. BIERMAN, M.D.
MARION MURPHY, R.N.
T. G. PULLEN, JR.
ROSEMARY KENT
VIVIAN DRENCKHAHN
PEARL RORABAUGH

Medium-Size Community Group B—Parlor B

Leader: ALICE V. KELIHER, PH.D.

Recorder: N. P. NEILSON, PH.D.

Consultants:

JOSEPH I. LINDE, M.D.
MARION FEGLEY, R.N.
FLORENCE BEAUMONT
PAULINE J. WILLIAMS
FLORENCE C. O'NEILL

Large City Group C—Parlor C

Leader: DOROTHY B. NYSWANDER, PH.D.

Recorder: GEORGE T. PALMER, DR.P.H.

Consultants:

HAROLD H. MITCHELL, M.D.
ALBERT D. KAISER, M.D.
BERYL LUSSOW, R.N.
S. S. LIFSON
MRS. WALTER MINCKS
WILLIAM H. BRISTOW
ALICE H. SMITH

Admission to the WORKSHOP is by card only. Those wishing to register may apply to Dr. George M. Wheatley, Secretary, School Health Section, 1 Madison Avenue, New York 10, N. Y.

TUESDAY, 2:30 P.M.

FIRST SPECIAL SESSION

*Ball Room**Presiding:* A. J. ALTMAYER.

NEW VENTURES TOWARD HEALTH SECURITY

The Present Status of Health Insurance in the United States. NATHAN SINAI, DR P.H.

Canada's Plans for Social Security. J. J. HEAGERTY, M.D.

Latin America Looks Toward the Future. Speaker to be announced.

Health Is Social Security. HOMER FOLKS, LL.D.

Discussion.

HEALTH OFFICERS AND PUBLIC HEALTH EDUCATION
SECTIONS*Joint Session—Roof Garden**Presiding:* MALCOLM R. BOW, M.D., and EDNA A. GERKEN.PLANNING FOR HEALTH EDUCATION IN THE WAR AND
POST-WAR PERIODS*Chairman:* W. W. BAUER, M.D.

The National Program. E. R. COFFEY, M.D., and JOHN W. STUDEBAKER.

The State Program. J. C. KNOX, M.D.

The Local Health Program. HUGH B. ROBINS, M.D.

Discussion. CHARLES E. SHEPARD, M.D.

VITAL STATISTICS

*First Session—Parlor 2**Presiding:* SELWYN D. COLLINS, PH.D., *Chairman*

International Vital Statistics. FORREST E. LINDER, PH.D.

Master Index of Vital Statistics. WILLIAM C. WELLING.

Report on the Use of the Confidential Death Certificate. THOMAS J. DUFFIELD.

Discussion.

Committee Reports.

Section Business.

TUESDAY, 2:30 P.M.

LABORATORY

Second Session—Madhattan Room

Laboratory Methods Used in Determining the Value of Sulfadiazine as a Prophylaxis Against Meningococcic Meningitis. COLONEL DWIGHT M. KUHN, M.C., and CAPTAIN HARRY A. FELDMAN, M.C.

Health of the Army in Mobilization and War. LIEUTENANT COLONEL KARL R. LUNDEBERG, M.C.

Immunizations in the United States Army. LIEUTENANT COLONEL ARTHUR P. LONG, M.C.

*Round Table Discussion:*TROPICAL DISEASE PROBLEMS OF PUBLIC HEALTH LABORATORIES
OF THE UNITED STATES AND CANADA*Participants:*

REGINALD M. ATWATER, M.D.

DONALD L. AUGUSTINE, M.D.

L. T. COGGESHALL, M.D.

HENRY E. MELENEY, M.D.

ERNEST L. STEBBINS, M.D.

INDUSTRIAL HYGIENE

First Session—Salle Moderne

Presiding: JAMES G. TOWNSEND, M.D., *Chairman.*

Industrial Health in the Post-war World. *Address of the Chairman.*
JAMES G. TOWNSEND, M.D.

Community Emergency Medical Service in War Industry. WARD L. MOULD, M.D.

Chemical Warfare—A Chemical and Toxicological Review. LIEUTENANT COLONEL JOHN R. WOOD.

The Convalescent and Rehabilitation Training Program in the Army Air Force. BRIGADIER GENERAL N. W. GRANT.

Section Business.

MATERNAL AND CHILD HEALTH

First Session—Georgian Room

Presiding: MYRON E. WEGMAN, M.D., *Acting Chairman.*

Section Business.

Panel Session: Rationing and the Diets of Mothers and Children.

Panel Leader: V. P. SYDENSTRICKER, M.D.

Participants: To be announced.

TUESDAY, 2:30 P.M.

ENGINEERING

First Session—Parlor 1

Presiding: A. H. WIETERS, Chairman.

A SYMPOSIUM ON THE IMPACT OF THE WAR ON
SANITARY ENGINEERING

Meeting the Public Health Engineering Problems of the Army
Abroad. COLONEL W. A. HARDENBERGH, SN.C.

Meeting the Public Health Engineering Problems of the Navy. Speaker
to be announced.

Problems in Civilian Government Occasioned by the War. ARTHUR D.
WESTON.

The Sanitary Engineer in Civilian Defense. Speaker to be announced.

Procurement and Assignment of Sanitary Engineers for Military Needs.
CAPTAIN C. W. KLASSEN.

Section Business.

FOOD AND NUTRITION, AND SCHOOL HEALTH
SECTIONS, AND AMERICAN SCHOOL
HEALTH ASSOCIATION

Joint Session—Conference Room 3, Parlors B and C

See p. 1153.

TUESDAY, 4:30 P.M.

SCHOOL HEALTH

Business Meeting—Parlor C

TUESDAY, 8:30 P.M.**FIRST GENERAL SESSION***Ball Room*

Presiding: ALLEN W. FREEMAN, M.D., *President*, American Public Health Association.

Addresses of Welcome:

ERNEST L. STEBBINS, M.D., *Commissioner of Health*

EDWARD S. GODFREY, JR., M.D., *State Commissioner of Health*

Address. THE HONORABLE FIORELLO H. LA GUARDIA, *Mayor of New York City.*

Planning Today for Public Health Administration Tomorrow. FELIX J. UNDERWOOD, M.D., *President-elect*, American Public Health Association.

Presentation of the Sedgwick Memorial Medal Award.

Reception to the President and the President-elect. (Under the auspices of the Public Health Association of New York City.)

WEDNESDAY, 9:30 A.M.**LABORATORY***Third Session—Roof Garden**Section Business.***WHAT IS HAPPENING IN THE LABORATORY FIELD***A series of abridged papers*

Ante-mortem Serology and Post-mortem Lesions in Syphilis. PAUL D. ROSAHN, M.D.

Serologic Reactions following Smallpox Vaccination. JOSEPH M. LUBITZ, M.D.

Methods for Studying Sanitary Conditions of Eating Establishments. JOHN W. WILLIAMS, M.D. and CATHARINE ATWOOD.

Results Obtained in the Use of "EC" Medium by Various Laboratories. C. A. PERRY, Sc.D., and A. A. HAJNA.

Gonococci Cultures. A State Laboratory Service. MARGARET W. HIGINBOTHAM, Sc.D.

Serological Identification of Dysentery Bacilli. KENNETH M. WHEELER, Ph.D.

Production of Polyvalent Antipneumococcal Serum. GEORGE F. FORSTER, Ph.D. and HOWARD J. SHAUGHNESSY, Ph.D.

Human Serum Albumin as a Stabilizing Agent for Schick Toxin. GEOFFREY EDSALL, M.D., and LOUISE WYMAN.

Production of Exotoxins on Culture Media Prepared from Human Red Cells. FRANK G. JONES.

WEDNESDAY, 9:30 A.M.

LABORATORY (Cont.)

Further Studies on One Type of Paracolon. C. A. STUART, PH.D., and
LIEUTENANT ROBERT RUSTIGIAN, SN.C.

Complement-fixation Studies in Lymphogranuloma Venereum. CLARA
NIGG, PH.D., C. H. MANN, M.D., and BETTY BOWSER, PH.D.

Laboratory Service in an Epidemic of Tinea Capitis Caused by Micro-
sporum Audouini. RHODA W. BENHAM, PH.D., and HAROLD H. MITCHELL,
M.D.

Tetanus Toxoid on Peptone-Free Media. J. HOWARD MUELLER, PH.D.

SECOND SPECIAL SESSION

Ball Room

Presiding: HARRY S. MUSTARD, M.D.

PUBLIC HEALTH IMPLICATIONS OF TROPICAL AND
IMPORTED DISEASES

The Public Health Implications of Imported Malaria and Dysenteries.
Speaker to be announced.

The Public Health Aspects of Certain Helminthic, Protozoan, and
Mycotic Infections Resulting from the War. HENRY E. MELENEX, M.D.

Yellow Fever and Classic Typhus and the Possibility of Their Intro-
duction into the United States. W. A. SAWYER, M.D.

Strategy Against the Global Spread of Disease. THOMAS PARRAN, M.D.

Discussion.

HEALTH OFFICERS

Second Session—Salle Moderne

Post-war Dental Programs for Official Health Agencies. G. A. NEVITT,
D.D.S.

Results of Medical and Dental Examinations of 2,500 Senior High
School Students. (A Part of the National Victory Corps Physical Fit-
ness Program.) CARL A. WILZBACH, M.D.

Plasma Reserves for Civilian Defense, Their Distribution, Control,
Preparation, Administration, and Clinical Use. JOHN B. ALSEVER, M.D.

Wartime Problems of the County Health Officer. HUBERT O. SWART-
OUT, M.D.

The Function of the Health Officer in the Control of Tuberculosis
Among Veterans. LOUIS I. DUBLIN, PH.D.

WEDNESDAY, 9:30 A.M.**PUBLIC HEALTH EDUCATION AND SCHOOL HEALTH
SECTIONS***Joint Session—Parlors 1 and 2**Presiding:* EDNA A. GERKEN, and LEONA BAUMGARTNER, M.D.**THE UTILIZATION OF COMMUNITY RESOURCES IN THE PREVENTION
OF JUVENILE DELINQUENCY IN WARTIME***School Group—Parlor 1**Participants:*

W. CARSON RYAN, Ph.D.
ORAN GRAFF
CAROLINE B. ZACHRY, Ph.D.
VIRGINIA L. SINTOW
HOWARD FUNK
OLGA BRUCHER
J. C. WRIGHT
VINAL H. TIBBETTS
MARION FEGLEY, R.N.
A. L. THRELKELD

*Community Group—Parlor 2**Participants:*

SAMUEL M. BROWNELL, Ph.D., *Discussion Leader*
L. C. ROBBINS, M.D.
WADE D. CASHION
GEORGE NIHAN
EDITH BALMFORD
MARY P. LORD
MRS. BEN AIKEN
JUDGE JUSTINE WISE POLIER
SUEAN M. TULLY
SOPHIE THEIS
RUTH MATSON

**INDUSTRIAL HYGIENE, FOOD AND NUTRITION, AND
PUBLIC HEALTH NURSING SECTIONS***Joint Session—Georgian Room**Presiding:* JAMES G. TOWNSEND, M.D., IRA A. MANVILLE, M.D., and ELLA E. MCNEIL, R.N.**Standing Orders for Nurses in Industry.** Prepared by the Council on Industrial Health, American Medical Association. CARL M. PETERSON, M.D.**Practical Experience in Industrial Health Education.** LAWRENCE WEAVER, M.D.**Nutrition—A Factor Important for Industrial Hygiene.** GEORGE R. COWGILL, Ph.D.**Costs, Space, Personnel and Equipment for Feeding Programs in Small Plants.** WAYNE L. RITTER, M.D.**The Industrial Nurse in Wartime.** CATHERINE R. DEMPSEY, R.N.

WEDNESDAY, 9:30 A.M.

ENGINEERING

Second Session—Madhattan Room

A SYMPOSIUM ON RECENT DEVELOPMENTS IN SANITARY
ENGINEERING

Engineering Problems in the Use of Glycol Vapors for Air Sterilization.
BURGESS H. JENNINGS.

Modern Malaria Control. MARK D. HOLLIS.

Army Field Water Supply Developments. CAPTAIN HAYSE H. BLACK.

Philosophy and Future of Milk Control. J. LLOYD BARRON, C.E.

Factors Affecting Germicidal Efficiency of Chlorine and Chloramines.
LIEUTENANT COLONEL MAX LEVINE, SN.C., and CAPTAIN GEORGE C. WEBER,
SN.C.

WEDNESDAY, 2:30 P.M.

THIRD SPECIAL SESSION

Ball Room

CURRENT HEALTH DEPARTMENT PROBLEMS IN WAR

Panel Leader: HUNTINGTON WILLIAMS, M.D.

Participants: To be announced.

GOVERNING COUNCIL

Second Meeting—Parlor 2

EPIDEMIOLOGY AND LABORATORY SECTIONS

Joint Session—Georgian Room

Presiding: ERNEST L. STEBBINS, M.D., and PEARL L. KENDRICK, SC.D.

Epidemiology of Atypical Pneumonia. ALEXANDER D. LANGMUIR, M.D.

Status of Immunity in Human Subjects Artificially Infected with
Influenza Virus, Type B. THOMAS FRANCIS, JR., M.D., H. E. PEARSON,
M.D., JONAS E. SALK, and PHILIP N. BROWN.

Chile's Most Severe Epidemic of Meningococcus Meningitis (1942).
MARIO D. PIZZI, M.D.

Meningococcus Infections in the Army. JOHN J. PHAIR, M.D.

Epidemic Keratoconjunctivitis—the Detroit Experience. JOSEPH G.
MOLNER, M.D.

Epidemic Keratoconjunctivitis—Correlation of Epidemiologic Data and
Results of Serum Virus Neutralization Tests. ROBERT F. KORNS, M.D.,
and MAJOR MURRAY SANDERS, M.C.

WEDNESDAY, 2:30 P.M.**VITAL STATISTICS SECTION AND AMERICAN
ASSOCIATION OF REGISTRATION EXECUTIVES***Joint Session—Salle Moderne**Presiding:* SELWYN D. COLLINS, PH.D., and WILLIAM C. WELLING.*The Committee on Vital Records.* LOWELL J. REED, PH.D.*Discussion:* A. W. HEDRICH, SC.D., and HALBERT L. DUNN, M.D.*Vital and Health Statistics in the Federal Government.* SELWYN D. COLLINS, PH.D.*Discussion:* HUNTINGTON WILLIAMS, M.D.*Problems in Population Estimation.* ELBRIDGE SIBLEY.*Discussion:* THOMAS B. RHODES.**MATERNAL AND CHILD HEALTH***Second Session—Madhattan Room**Section Business.***PUBLIC HEALTH AGENCIES AS ADMINISTRATORS OF A MEDICAL CARE
PROGRAM FOR WIVES AND INFANTS OF ENLISTED
MEN IN THE ARMED FORCES**

A Medical Care Program for Wives and Infants of Men in Service as Part of a County Health Department Program. Speaker to be Announced.

A Medical Care Program for Wives and Infants of Men in Service as Part of a State Health Department Program. MERL J. CARSON, M.D.

A Year's Experience with the Administration by Public Health Agencies of a Medical Care Program for Wives and Infants of Men in Service. MARTHA M. ELIOT, M.D.

INDUSTRIAL HYGIENE*Second Session—Parlor 1*

Automatically Controlled Suction Device for Field Air Sampling. ALFRED SETTERLIND.

Current Progress in Sterilization of Air. STUART MUDD, M.D.

Luminous Dial Painting—A Warning and a Practical Control Program. MANFRED BOWDITCH.

The Problem of Industrial Noise. PAUL SABINE, PH.D.

WEDNESDAY, 2:30 P.M.

FOOD AND NUTRITION AND SCHOOL HEALTH SECTIONS
AND AMERICAN SCHOOL HEALTH ASSOCIATION*Joint Session—Roof Garden**Presiding:* IRA A. MANVILLE, M.D., LEONA BAUMGARTNER, M.D., and CHARLES L. OUTLAND, M.D.

WAR'S IMPACT ON THE HEALTH OF SCHOOL CHILDREN

The Implications of Family Dislocation. LAWRENCE K. FRANK, PH.D.

The Increasing Responsibility of the Teacher. CAROLINE B. ZACHRY, PH.D.

Favorable and Adverse Developments in the School Environment.
ABEL WOLMAN, DR.ENG.

Maintaining the Nutrition of the Child in School. VIVIAN DRENCKHAHN.

Preparing School Physicians for Increased Responsibilities. PARKER DOOLEY, M.D.

WEDNESDAY, 5:00 P.M.

PUBLIC HEALTH NURSING

Business Meeting—Parlor B

WEDNESDAY, 8:30 P.M.

SECOND GENERAL SESSION

*Ball Room**Presiding:* ALLEN W. FREEMAN, M.D., *President, American Public Health Association.**Presentation of Forty Year Membership Certificates.**Recognition of National Health Honor Roll Health Officers.**Association Business.**Address. Speaker to be announced.*

THURSDAY, 9:30 A.M.

INDUSTRIAL HYGIENE AND HEALTH OFFICERS
SECTIONS*Joint Session—Ball Room*

Presiding: JAMES G. TOWNSEND, M.D., and MALCOLM R. BOW, M.D.

State Support of Industrial Hygiene—Its Urgent Necessity. WARREN F. DRAPER, M.D.

The Private Physician, the Health Department and the Small Industrial Plant. STANLEY J. SEEGER, M.D.

Procurement and Assignment—The Problem of the Industrial Hygiene Engineer. CLARENCE D. SELBY, M.D.

Preventive Industrial Dentistry. C. R. TAYLOR, D.D.S.

The Industrial Health Program of the Chamber of Commerce of the United States of America. HOWARD STRONG.

FOOD AND NUTRITION, MATERNAL AND CHILD
HEALTH, PUBLIC HEALTH NURSING, AND
SCHOOL HEALTH SECTIONS*Joint Session—Parlors B and C, and Conference Room 3*

HEALTH STANDARDS FOR DAY CARE CENTERS FOR CHILDREN

This will be conducted as three simultaneous round tables, each with experts in the fields of clinical pediatrics, public health nursing, nutrition, early childhood education, child guidance, social work, and sanitary engineering. While the discussion in all three instances will revolve around the needs of the child, of the family, and of the community, there will be different prime orientations. One table will approach the problem chiefly from the state level, one from the point of view of the large city, and one with regard to the small city. Since space will be limited sharply, it will be essential to make reservations in advance by mail. It is requested that persons desiring to attend one of these round tables signify this desire by writing to DR. MYRON E. WEGMAN, *Acting Chairman*, Maternal and Child Health Section, 411 East 69th Street, New York 21, N. Y., indicating their preference.

Participants:

LEONA BAUMGARTNER, M.D.
JOSEPH I. LINDE, M.D.
A. CLEMENT SILVERMAN, M.D.
MILTON I. LEVINE, M.D.
DOROTHY BAKER
ANNA DEPLANTER BOWES

MARY A. SWEENEY
DOROTHEA BEHM
ERNEST G. OSBORNE, PH.D.
AMY HOSTLER
ARNOLD L. GESELL, M.D.
WILMER SCHULZE

PUTTING MERIT INTO THE MERIT SYSTEM

Club Room

An informal discussion among personnel officers, members of the Association's Merit Systems Unit, and others interested.

THURSDAY, 9:30 A.M.

ENGINEERING

*Third Session—Parlor 1*A SYMPOSIUM ON POST-WAR OPPORTUNITIES AND RESPONSIBILITIES
OF THE SANITARY ENGINEERObjectives in the Programming of Post-war Sanitation Work. EARNEST
BOYCE.Housing Problems of Interest to the Public Health Engineer. M. ALLEN
POND.The Place of the Sanitary Engineer in Occupied Countries. Speaker
to be announced.Sanitary Engineering in the Western Hemisphere. MAJOR HAROLD B.
GOTAAS.

EPIDEMIOLOGY

Second Session—Roof Garden

SYMPOSIUM ON GONORRHEA

The Present Status of Gonorrhea Control. MAJOR WILLIAM A. BRUM-
FIELD, M.C.Methods of Transporting Gonococci to Laboratories for Cultural Study.
OSCAR F. COX, M.D.The Correlation of in vitro Sulfonamide Resistance of the Gonococcus
with Failure of Sulfonamide Therapy in 105 Patients with Gonorrhea.
C. M. CARPENTER, M.D., H. ACKERMAN, M. E. WINCHESTER, M.D., and
J. WHITTLE.Penicillin in the Treatment of Gonorrhea in Men. JOHN F. MAHONEY,
M.D.Control of Gonorrhea through Treatment of Women While in Deten-
tion Homes. OWEN F. AGEE, M.D.

ORAL HEALTH GROUP

*First Session—Parlor 2**Presiding: C. R. TAYLOR, D.D.S., Chairman.*

POST-WAR IMPLICATIONS OF FLUORINE AND DENTAL HEALTH

From the Viewpoint of an Epidemiologist. H. TRENDLEY DEAN, D.D.S.

From the Viewpoint of a Water Works Engineer. RAYMOND J. FAUST.

From the Viewpoint of Operative Dentistry. JOHN W. KNUTSON, D.D.S.

From the Viewpoint of Public Health Dentistry. A. O. GRUEBBEL, D.D.S.

THURSDAY, 9:30 A.M.

LABORATORY

Fourth Session—Salle Moderne

Bacteriological Methods for Controlling Cheese Quality. M. W. YALE.

Laboratory Technics for Determining the Sanitary Quality of Milk.
WALTER L. MALLMANN, PH.D., and C. S. BRYAN, PH.D.

Rôle of the Laboratory in Investigating Milk-borne Epidemics. C.
SIDNEY LEETE.

An "Information Please" Board of Milk Experts.

Leader: C. A. ABELE, CH.E.

Participants:

ROBERT S. BREED, PH.D.

W. D. DOTERRER

FRIEND LEE MICKLE, SC.D.

WALTER D. TIEDEMAN, M.C.E.

PUBLIC HEALTH EDUCATION

*Second Session—Georgian Room*THE PREPARATION OF HEALTH EDUCATION PERSONNEL FOR THE
WAR AND POST-WAR PERIODS

Chairman: HENRY F. VAUGHAN, DR.P.H.

The Responsibility of the School of Public Health. HUGH R. LEAVELL,
M.D.

Supervised Field Work. LUCY S. MORGAN, PH.D.

Preparation of the Public School Teacher. RUTH E. GROUT, PH.D.

Discussion. MAYHEW DERRYBERRY, PH.D.

THURSDAY, 2:30 P.M.

FOURTH SPECIAL SESSION

Ball Room

Presiding: ABEL WOLMAN, DR.ENG.

THE EVOLVING PATTERN OF TOMORROW'S HEALTH

Prerequisites to Better Public Health. JOSEPH W. MOUNTIN, M.D.

The Health Worker of the Future. WILLIAM P. SHEPARD, M.D.

The Post-war City. C.-E. A. WINSLOW, DR.P.H.

The Health Department of the Future. HENRY F. VAUGHAN, DR.P.H.

Hemispheric Horizons for the Future. FELIX HURTADO, M.D.

THURSDAY, 2:30 P.M.

EPIDEMIOLOGY, HEALTH OFFICERS, MATERNAL AND
CHILD HEALTH, AND LABORATORY SECTIONS*Joint Session—Georgian Room*

Presiding: ERNEST L. STEBBINS, M.D., MALCOLM R. BOW, M.D., MYRON E. WEGMAN, M.D., and PEARL L. KENDRICK, Sc.D.

DIARRHEAL DISEASES IN WARTIME

An Epidemic of 3,000 Cases of Bacillary Dysentery Involving a War Industry and Members of the Armed Forces. C. H. KINNAMAN, M.D., and F. C. BEELMAN, M.D.

A Fly-borne Bacillary Dysentery Epidemic in a Large Military Organization. COLONEL DWIGHT M. KUHN, M.C., and LIEUTENANT THEODORE G. ANDERSON, Sn.C.

Newer Procedures in Laboratory Diagnosis and Therapy in the Control of Bacillary Dysentery. A. V. HARDY, M.D., and JAMES WATT, M.D.

Salmonellosis as a Public Health Problem in Wartime. ROY F. FEEMSTER, M.D., and A. D. RUBENSTEIN, M.D.

Two Outbreaks of Epidemic Diarrhea of the New-born in One Hospital; Relationship to Reduced Personnel. PAUL A. LEMBCKE, M.D., JAMES J. QUINLIVAN, M.D., and NORRIS G. ORCHARD, M.D.

Studies on Epidemic Diarrhea of the New-born; Isolation of a Filtrable Agent Causing Diarrhea in Calves. J. S. LIGHT, M.D., and LIEUTENANT H. L. HODES, M.C.

FOOD AND NUTRITION

Second Session—Roof Garden

NUTRITION RESEARCH

Food and Nutrition Policy Here and Abroad. FRANK G. BOUDREAU, M.D.

Contrasts and Comparisons of England's and America's Wartime Nutrition Practices. MARGARET MEAD, Ph.D.

Wartime Nutrition in England as a Public Health Problem. HUGH MACDONALD SINCLAIR, M.D.

Influence of Cultural Factors upon the Nutritional Values of Vegetables. L. A. MAYNARD, Ph.D.

Nutrition Survey of an Entire Rural County in North Carolina. D. F. MILAM, M.D.

NOTE: There will be a meeting of the Section Council immediately following this session.

THURSDAY, 2:30 P.M.**SCHOOL HEALTH SECTION, AMERICAN SCHOOL HEALTH
ASSOCIATION, AND ORAL HEALTH GROUP***Joint Session—Salle Moderne*

Presiding: LEONA BAUMGARTNER, M.D., EARL E. KLEINSCHMIDT, M.D., and
C. R. TAYLOR, D.D.S.

**Implications of the Victory Corps Program from the Dental Point
of View.** J. A. SALZMANN, D.D.S., and LEON R. KRAMER, D.D.S.

**Implications of the Victory Corps Program from the Health Officer's
Point of View.** CARL A. WILZBACH, M.D.

**Implications of the Victory Corps Program from the Educator's Point
of View.** JOHN LUND.

**Report of the Conclusions of the Workshop Session on Adjustments
of School Health Personnel in Wartime.**

THE TECHNICAL EXHIBITS

MEZZANINE AND FOYERS, HOTEL PENNSYLVANIA

As befits a Wartime Conference, the Twenty-fifth Health Exhibit is streamlined and of the utmost simplicity in its arrangement and decor. Exhibitors are using limited space to bring practical information to health workers. They describe their exhibits as follows:

A. S. ALOE COMPANY

St. Louis, Mo. Nos. 71 AND 72

Laboratory apparatus and public health equipment of interest to current wartime problems; blood plasma apparatus of the most modern design for the taking and administration of blood, adaptable to large-scale operation or to small blood bank procedures; serological and bacteriological equipment; new and recent items of interest.

A capable member of the company will be present to give information on priorities and recent regulations for obtaining essential laboratory and public health medical equipment.

AMERICAN CAN COMPANY

NEW YORK, N. Y. Nos. 18 AND 19

The American Can Company will feature the second edition of the Canned Food Reference Manual—a publication of its research laboratories. Greatly expanded in size (over 500 pages) as well as in scope, this edition contains a compilation of the latest findings of research on canned foods, canning procedures, food essentials, modern dietary practices, nutritional and public health aspects. Over 100 illustrations dot the text. Of special interest to the public health official will be the numerous photomicrographs of vitamins embodied in the chapter on "Chemistry of the Vitamins," information on cans and canned foods in the light of wartime restrictions, and 200 pages of tables and charts in the appendix. As in the past it is presented gratis to members of the American Public Health Association and members of the medical profession. Public health officials may make their requests for copies by registering in CANCO'S booths Nos. 18 and 19.

THE AMERICAN JOURNAL OF NURSING

NEW YORK, N. Y. No. 56

Changes without precedent are taking place in nursing as a result of war, and these changes, in all their implications for the post-war future, are recorded, month by month, only in the American Journal of Nursing.

The Journal's publishers take especial pride in the fact that thousands of public health nurses keep informed through its pages, and that, among all its subscribers, of fifteen or more years' standing, public health nurses occupy first place.

BALTIMORE BIOLOGICAL LABORATORY

BALTIMORE, Md. No. 4

Exhibit of dehydrated bacteriological culture media and new peptones. Demonstration of B-B-L Desoxycholate, Desoxycholate Citrate Agars and Selenite-F Enrichment for the isolation of intestinal

pathogens. B-B-L Anaerobic Agar and Brewer Petri dish cover for surface cultivation of anaerobes. B-B-L Thioglycolate Medium for sterility testing of biologics. Anaerobic Apparatus and Pipetting Machine.

BECTON, DICKINSON & COMPANY

RUTHERFORD, N. J. No. 2

Becton, Dickinson will have on display syringes and needles used for blood taking, blood tests and transfusion. Data on the conservation and standardization of instruments used in this work will also be available.

THE BORDEN COMPANY

NEW YORK, N. Y. No. 51

In a graphic and interesting manner, the exhibit of The Borden Company will explain the problem of "supply and demand" of dairy products for 1943. The anticipated amounts needed by the army and lend-lease commitments and civilians will be compared with the amount of milk expected to be produced in 1943.

CAMEL CIGARETTES—MEDICAL RELATIONS DIVISION

NEW YORK, N. Y. Nos. 57 AND 58

CAMEL Cigarettes will exhibit large detailed photographs of equipment used in comparative tests of the five largest-selling brands of cigarettes. Dramatic visualization of nicotine absorption in the human respiratory tract from cigarette smoke will be demonstrated. International news with the CAMEL Cigarette Trans-Lux "Flash Bulletins," may be seen while enjoying a supply of slow-burning CAMEL Cigarettes.

CARNATION COMPANY

OCONOMOWOC, Wis. No. 67

You are invited to visit the Carnation Company booth, No. 67, where you will find presented some interesting information on the various uses of Irradiated Carnation Milk for infant feeding, child feeding, and general diet purposes. Valuable literature will also be available for distribution.

CARWORTH FARMS, INC.

NEW CITY, N. Y. No. 33

This exhibit will demonstrate that mice, similar externally, may be very different, one from another. Litters will be shown derived from matings of randombred and purebred stocks. It will be shown that, not only is the cost of an experiment using miscellaneous heterozygous animals much greater than when selectively bred homozygous animals are used, but also with the latter the results are far more accurate statistically. Diet and its relation to uniformity will be discussed.

CHURCH & DWIGHT COMPANY, INC.

NEW YORK, N. Y. No. 32

Twenty-five years before the first meeting of The American Public Health Association, Church and Dwight Company pioneered in first producing Bicarbonate of Soda in the Western Hemisphere.

For nearly a century, this company has endeavored to make this important product available at low cost.

Today, Arm & Hammer Bicarbonate of Soda, known generally as Baking Soda, can be found in nearly every household. The low cost, purity, and availability of Arm & Hammer, and the fact that it is approved as a dentifrice by the American Dental Association Council, are reasons so many Health Officers recommend it in their Dental Health Educational work.

CLAY-ADAMS COMPANY, INC.

NEW YORK, N. Y. No. 64

Laboratory Instruments and Supplies including the cardboard slide mailers, centrifuges, blood and other counters, Gold Seal slides and cover glasses, agglutination slides, slide boxes and specialties for microscopy and laboratory use will be displayed.

Also Educational Material including anatomical charts, skeletons, demonstration skulls, Ayers and other obstetrical manikins, Chase Hospital Dolls, Medical and Surgical Specialties including Cacoprene (synthetic rubber) catheters, drains, tubes, utility forceps, Justrite Elastic Dressing, and Fracture Splints are included in the exhibit and a Medichrome Library of 2 in. x 2 in. Kodachromes on medical and nursing subjects including tropical medicine, normal histology, nursing procedures, and others.

THE COCA-COLA COMPANY

ATLANTA, GA. Nos. 28 AND 29

Coca-Cola will be served to the delegates with the compliments of The Coca-Cola Company.

CORNING GLASS WORKS

CORNING, N. Y. No. 40

The Corning Glass Works will display various types of Laboratory Glassware mounted on a suitable panel. This exhibit will include "Pyrex" Brand Blood Gas Apparatus, Centrifuge Tubes and Bottles, Culture Dishes, Tubes and Flasks, Pipettes, and Blood Bank Bottle. A few samples of "Pyrex" Brand Lifetime Red Low Actinic Ware, "Pyrex" Brand Fritted Ware and "Vycor" Brand Ware Fabricated of 96% Silica Glass No. 790, will also be shown.

THE CREAM OF WHEAT CORPORATION

MINNEAPOLIS, MINN. No. 17

Both Enriched 5-Minute and Regular Cream of Wheat will be on display. A convenient and completely revised Vitamin chart and Recipes for the use of Cream of Wheat as a meat-extender will be available in quantities for class use.

Zing, stabilized wheat germ, will also be on display. It is made from high vitamin germ, requires no refrigeration, and is economically priced.

DIFCO LABORATORIES, INC.

DETROIT, MICH. Nos. 49 AND 50

This is an exhibit of dehydrated culture media prepared according to the formulae of the American Public Health

Association's "Standard Methods of Water Analysis" and "Standard Methods for the Examination of Dairy Products," as well as other media of particular interest in public health bacteriology.

Bacto-S S Agar, Bacto-MacConkey Agar and other media for isolation and identification of members of the typhoid-paratyphoid-dysentery group will be demonstrated.

EFFERVESCENT PRODUCTS, INC.

ELKHART, IND. No. 10

Demonstration of urine-sugar analysis by the new Clinitest Tablet Method—reliable, simple, fast, single tests being made in less than one minute. A sensitive qualitative test giving dependable quantitative estimations up to 2%.

The same chemical principles involved in the standard copper-reduction methods are the basis of Clinitest—except external heat is eliminated as the Clinitest Tablet itself generates the required heat.

EIMER AND AMEND

NEW YORK, N. Y. No. 38

The major theme of the Eimer and Amend exhibit will be based on the reagents and apparatus necessary to carry through on the major important water analyses, as outlined in the A.P.H.A. Eighth Edition of Standard Methods for the Examination of Water and Sewage. This will include instrumental methods now in use in some water laboratories as well as specific reagents, such as standard soap solution, Nessler reagent, stable starch solution, E. & A. Karl Fisher Reagent solution, etc. A few selected modern, efficient laboratory instruments of use to clinical laboratories will also be on display and in operation.

EISELE & COMPANY

NASHVILLE, TENN. No. 37

Visit Booth No. 37 and see the new "Eisele Temp-Guard Baby Bottle" which will be on display. This bottle is designed to remove the guesswork from baby's feeding and to protect baby's health. Eisele & Company will also have on display their Clinical Thermometers including the glass case Self-Sterilizing Thermometer, Green Plungered Hypodermic Syringes, Hypodermic Needles, Eco Sanelastic Bandages, elastic without rubber, and other specialties.

J. H. EMERSON COMPANY

CAMBRIDGE, MASS. No. 22

The Emerson Resuscitator, Inhalator and Aspirator, in models suitable for use by Marine and other hospitals, industrials and the Armed Forces will be shown. Another feature will be the new Hot Pack apparatus for the rapid and neat preparation of all hot packs, which has received a wide acclimation in the hospital field. Also included will be the well known Emerson Respirator with its many features including the intermittent aspirator and automatic alarms.

EVAPORATED MILK ASSOCIATION

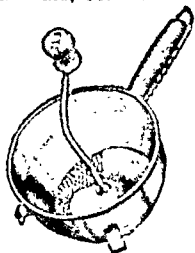
CHICAGO, ILL. No. 63

Visit the Evaporated Milk Association booth to inspect educational material for nutrition programs. Material covers infant feeding, preschool feeding, low-cost family feeding, and quantity food preparation for industrial feeding, school lunches, canteen feeding and related ac-

tivities. Registration at the booth will assure that sample copies will be sent to you. Members of the Association technical staff will be on hand to answer questions on evaporated milk nutritive properties, availability and uses—war and civilian.

FOLEY MANUFACTURING COMPANY

MINNEAPOLIS, MINN. No. 6



Representatives in Booth No. 6 will welcome an opportunity to demonstrate to members how practical the Foley Food Mill (declared a civilian essential) is for straining all fresh cooked vegetables and fruits for babies and adults on smooth diets. A special offer will be made to all members during the Convention.

GENERAL ELECTRIC X-RAY CORPORATION

CHICAGO, ILL. No. 55

Since mass x-ray chest surveys with miniature films is a widely discussed subject among public health authorities these days, may we suggest that you take opportunity during this meeting to discuss with us the G-E Photo-Roentgen Unit. You'll be interested in learning about the many G-E installations now operating in all sections of the country, not only in hospitals and clinics, but also in busses and trailers which make it possible to include conveniently the smallest outlying district in these surveys. Ask particularly about the 4 by 5-inch stereo chest films produced with this apparatus. And after you have seen them under illumination in the Orthostereoscope specially designed for this purpose, we're sure you will agree that this development for x-ray chest survey is a timely one and should greatly augment anti-tuberculosis field work.

GERBER PRODUCTS COMPANY

FREMONT, MICH. No. 15

Gerber's CEREAL FOOD and STRAINED OATMEAL, two special infant cereals, are thoroughly cooked, dried, and ready to serve merely upon addition of milk or formula. They are both fortified in not only thiamin but other members of the vitamin B complex and in iron. These, as well as the other Gerber Baby Foods will be on display. Literature for distribution to mothers and adults on restricted diets and also professional material are at the booth for your inspection.

THE GILLILAND LABORATORIES, INC.

MARIETTA, PA. No. 16

The Gilliland Laboratories will have on display at Booth No. 16 a complete line of Biological Products. This firm gives special attention to supplying Biological Products to State, City and County Boards of Health, Hospitals and Institutions. The representative in charge of this exhibit will be pleased to answer any inquiries.

GRADWOHL SCHOOL OF LABORATORY TECHNIQUE

ST. LOUIS, MO. No. 54

This exhibit is designed to show one of our teaching methods, namely, a descriptive cabinet on the mechanism of the Rh factor and its importance in blood transfusion. The exhibit will also include a number of high grade laboratory reagents, particularly Giemsa stain manufactured by this organization, a Commission-certified product.

INTERNATIONAL CELLULOCOTTON PRODUCTS COMPANY

CHICAGO, ILL. No. 45

This exhibit will feature an up-to-the-minute program on menstrual education for women in industry.

For women workers: "That Day Is Here Again"—a 16 page illustrated booklet. Debunks old superstitions. Covers important Do's and Don'ts. Gives posture improving exercises. Stresses need for personal care.

For industrial nurses and advisers—Menstrual charts—a complete visual explanation of menstruation. Also: "Just to Review"—a technical explanation of menstruation—clear, modern, authoritative.

The International Cellulocotton Products Company manufactures Kotex and Fibs.

KELLOGG COMPANY

BATTLE CREEK, MICH. No. 62

The Kel-Bowl-Pac now featured in the Kellogg Variety Package is an important addition to the snack menu and for the school lunch, because of its convenience. The PACKAGE is the BOWL!

All Kellogg ready-to-eat cereals either are made from whole grains or are restored to whole grain nutritive value. Kellogg's Pep Whole Wheat Flakes is fortified with extra vitamins B₁ and D. One serving (1 ounce) furnishes $\frac{1}{4}$ the daily requirements for adults for B₁ and sufficient vitamin D to meet all daily requirements for that vitamin.

KIMBLE GLASS COMPANY

VINELAND, N. J. No. 11

There will be shown Kimble Blue Line Exax and Normax Precision Retested graduated ware and Kimble & Brand laboratory glassware and apparatus.

Especially featured will be bottles and other glass parts for preparation and injection of parenterals, particularly blood plasma. These are highly resistant to chemical attack, offering maximum assurance of unimpaired quality and clinical safety.

All material obtainable from laboratory supply houses will be on display.

LEDERLE LABORATORIES, INC.

NEW YORK, N. Y. No. 3

Conforming with the general subject of American Public Health Association's Wartime Public Health Conference, Lederle Laboratories will feature in Booth No. 3 some of their outstanding products of special value in wartime.

The Vollmer Tuberculin Patch Test will be spotlighted. Other products to be featured are Blood Grouping Sera, used in identifying blood types for blood transfusions, Sulfadiazine, "The Drug of the Year," for infections, Tetanus Toxoid, Typhus Vaccine and Blood Plasma. Literature and samples which have to do with these products will be available through staff attendants at the Booth.

E. LEITZ, INC.

NEW YORK, N. Y. No. 41

Technical instruments which E. Leitz manufactures and distributes will be shown. One is Leitz Photo-Electric Clinical Colorimeter, widely used in hospitals, institutions, and by physicians for the accurate and quick quantitative determination of constituents of body fluids; another is the Leitz G & D Electro Titrator. This greatly facilitates the laboratory procedure. The principle it employs is that the end point is determined by a change in voltage of two suitably selected electrodes dipping into the solution which is being titrated, instead of being determined by a change of color of an indicator or of one of the reagents employed in the titration. There may also be available an instrument known as the Leitz Müller Photometer, a highly precise photo-electric research filter photometer which is easy to operate. The Leitz Desk Viewer for the viewing of 2x2" Kodachrome slides and 35 mm. film strips, and also the VIII-S Projector for projecting 2x2" slides and 35 mm. film strips, will be displayed, and, depending upon availability, Leica Camera equipment for macrophotography.

LILY-TULIP CUP CORPORATION

NEW YORK, N. Y. Nos. 59 AND 60

Lily-Tulip cups and containers have gone to war. This display is a pictorial review illustrating their economy and health protection value in the war effort—their use in mass feeding in the armed services, at post exchanges and ship's service, at service clubs, in hospitals, at shipyards and war production plants for feeding and safe water drinking—for food packaging, food rationing, and many other valuable uses important today.

J. B. LIPPINCOTT COMPANY

PHILADELPHIA, PA. No. 27

The exhibit of J. B. Lippincott Company will feature the new "Essentials of Industrial Health" by Dr. C. O. Sappington as well as another new and important work, "Essentials of Syphilology" by Dr. R. H. Kampmeier. Other important books on display will be Putnam's "Convulsive Seizures," a new manual for patients, the new second edition of Rigler's "Outline of Roentgen Diagnosis," Beardwood and Kelly's "Simplified Diabetic Management," and Girard's "Home Treatment of Spastic Paralysis." Be sure to see them.

LYONS ALPHA PRODUCTS CO., INC.

NEW YORK, N. Y. No. 34

The famous Lyons Sanitary Cream and Milk Dispensers "with the patented cream and milk faucets" will be exhibited. The outside body of these is white porcelain enamel; inside body, tinned copper. The cream dispenser is made from 6 quart to 20 quart size, and the milk dispensers from 6 to 40 quarts. The new Alpha 2 quart Cream Dispenser, and the Alpha Sterilizers will also be displayed.

THE MACMILLAN COMPANY

NEW YORK, N. Y. No. 53

Public Health Workers will find of special interest, at the Macmillan Booth 53, the new book by Dr. William R. P. Emerson, **HEALTH FOR THE HAVING**. It recommends itself as a valuable aid in public health work. Field workers

and administrators alike look to **COMMUNICABLE DISEASE CONTROL**, by Anderson-Arnstein, and **PUBLIC HEALTH ADMINISTRATION IN THE UNITED STATES**, by Dr. Smillie, for answers on public health questions. Among other books will be the popular **SO BUILD WE**, by Mary S. Gardner, **THE PUBLIC HEALTH NURSE IN ACTION**, by Marguerite Wales, and **RABIES**, by Dr. Leslie T. Webster.

THE MAICO CO. INC. OF N. Y.

NEW YORK, N. Y. No. 39

The precision hearing test instruments used by Army, Navy, Airlines, and ear physicians for hearing tests and examinations will be displayed by the MAICO CO. which provides more than 90% of all these precision hearing test instruments used in America. The new **HEARING DISABILITY CALCULATOR** and **Percentage of Loss Indicator**, available to all visiting physicians and public health officials, provides a quick and ready means of calculating any individual's exact hearing disability in accordance with the official standards of the American Medical Association.

THE MEDICAL BUREAU

CHICAGO, ILL. No. 48

In Booth No. 48, M. Burnice Larson offers the facilities of the Medical Bureau, an organization acting as counselor in problems of medical personnel to physicians and executives in the medical, industrial, and public health fields. The records of physicians who have specialized in the various branches of medicine, or those who have completed their training recently, as well as the records of administrators, registered nurses, bacteriologists, scientific workers, social workers, and dietitians, are available to those interested in the completion or reorganization of their staffs.

MERCK & CO., INC.

RAHWAY, N. J. No. 8

A set of vitamin reviews in a convenient slip-cover container designed for ready reference in library or bookcase is available at the Merck booth. In addition, information and literature on the arspenamines and tryparsamide may be obtained, and also a sample of *Cuprex*, widely used today for controlling the ever-present public health problem of pediculosis. A 15 minute application of *Cuprex* destroys the nits as well as the lice.

METROPOLITAN LIFE INSURANCE COMPANY

NEW YORK, N. Y. No. 46

The Welfare Division will maintain Consultation Headquarters in Booth 46. Members of its staff will be available for discussion of their special interests, and the use of the Company's health education materials. They hope not only to offer information but to receive suggestions from those active in these special fields and experienced in stimulating community action.

The subjects and times of the consultation periods are:

Rheumatic Fever Campaign, Monday P.M.; Nursing, Tuesday A.M.; Safety—"On and Off the Job," Tuesday P.M.; School Health Education, Wednesday A.M.; Industrial Hygiene, Wednesday P.M.; Community Health Campaigns—Films—Exhibits, Thursday A.M.; Nutrition, Thursday P.M.

MINE SAFETY APPLIANCES COMPANY

PITTSBURGH, PA. No. 35

In the M.S.A. booth, there will be featured a complete line of personal and plant protective equipment including: gas-detecting and indicating instruments; dust-sampling and counting instruments; dust, fume, and paint respirators; gas masks; oxygen breathing apparatus; inhalators; Skullgard protective hats; first aid kits and materials; goggles; asbestos and chrome leather protective clothing; Ear Defenders; Lilly Daché Hats for women industrial workers; Fend Barrier Protective Creams and Hand Lotions; Foille, the modern treatment for burns; and the Goggle Cleaning Station. M.S.A. representatives from both office and field will be in attendance to demonstrate this equipment and discuss your safety problems.

THE C. V. MOSBY COMPANY

St. Louis, Mo. No. 30

The C. V. Mosby Company extends to all attending the Wartime Conference of the American Public Health Association, a cordial invitation to look over its publications which will be on display at Booth No. 30. Books which will be of interest to public health workers include Turner "Personal and Community Health," Turner-McHose "Effective Living," Top "Handbook of Communicable Diseases," Lynch "Communicable Disease Nursing," and Cameron "Bacteriology of Public Health."

NATIONAL DAIRY COUNCIL

CHICAGO, ILL. Nos. 12 AND 13

Health education materials produced in the interest of nutrition in the war program are on display in the National Dairy Council booths—featuring information on the nutritive values of milk, ice cream, and the other dairy products. Posters and booklets which can be used in many phases of the public health program are available for examination. A catalogue of all materials will be sent to persons registering at the booth.

NATIONAL LIVE STOCK AND MEAT BOARD

CHICAGO, ILL. No. 61

The National Live Stock and Meat Board will have a nutrition exhibit showing the importance of meat in the adequate diet. Nutrition literature including the Nutrition Yardstick will be displayed.

OVAL WOOD DISH CORPORATION

TUPPER LAKE, N. Y. No. 9

Oval Wood Dish Corporation will again display in Booth 9 its complete line of RITESPOONS and RITEFORKS—sanitary single service eating utensils made of naturally pure wood. These spoons and forks are playing an important part in the sanitary feeding of defense workers in industrial plants throughout the country and in the feeding of our armed forces both here and abroad. They are considered one of the most outstanding single service items today. You are cordially invited to register for samples and literature.

PET MILK SALES CORPORATION

St. Louis, Mo. Nos. 69 AND 70

A complete display of material illus-

trating the time-saving Pet Milk services available to hospitals and physicians. Specially trained representatives will be in attendance to give you information about the production of Pet Milk and its use for infant feeding. Miniature cans will be given to members visiting the exhibit.

PARKE, DAVIS & COMPANY

DETROIT, MICH. No. 68



At the Parke-Davis Exhibit, which has been streamlined because of present wartime requirements, you will find many new and scientific Pharmaceutical and Biological Products. Included in this display are such outstanding preparations as Phemerol, a relatively non-toxic and non-irritating germicide and antiseptic; Vitamin Products; Sulfa Drugs; Despeciated Antitoxins, and numerous other outstanding products of timely interest. Able and courteous members of the Parke, Davis & Co. Staff are in daily attendance to serve you.

PETROGALAR LABORATORIES, INC.

CHICAGO, ILL. No. 7

You are cordially invited to visit the Petrogalar exhibit where a new and enlightening story on Petrogalar, an aqueous suspension of mineral oil, will be related. Beautifully colored anatomical drawings and new literature may be had upon request from our professional representatives who will be in constant attendance.

PHILIP MORRIS & CO., LTD., INC.

NEW YORK, N. Y. No. 31

Philip Morris & Company will demonstrate the method by which it was found that Philip Morris Cigarettes, in which diethylene glycol is used as the hygroscopic agent, are less irritating than other cigarettes. Their representative will be happy to discuss researches on this subject, and problems on the physiological effects of smoking.

POWERS X-RAY PRODUCTS, INC.

GLEN COVE, N. Y. No. 1

This exhibit features the Rapid Paper Film Method of X-raying chests of large groups of persons under the supervision of local physicians, without investment in chest x-ray equipment; demonstrates the diagnostic clarity of the 14 x 17 paper film in comparison with 14 x 17 transparent base film; and shows a typical roll of one hundred radiographs on a mechanical viewer.

THE PROCTER & GAMBLE COMPANY

CINCINNATI, OHIO No. 21

At the Procter & Gamble booth, visitors will see demonstrated some of the qualities of Ivory Soap which have resulted in Ivory's being recommended, "by more doctors than all other brands of soap together."

Copies of Ivory's new baby booklet, "Bathing Your Baby the Right Way," prepared with the cooperation of a world famous maternity center, will be available free of charge to visitors.

W. B. SAUNDERS COMPANY

PHILADELPHIA, PA. No. 14

The W. B. Saunders Company welcomes you to its exhibition at Booth No. 14 of its complete line of books on Medicine, Nursing, and Health. Among these will be new editions of McLester's Nutrition and Diet, Bower and Pilant's Communicable Diseases, Todd and Sanford's Clinical Diagnosis, and the following new books: the Military Medical and Surgical Manuals, the Manual of Industrial Hygiene, Stieglitz' Geriatric Medicine, and Vincent and Breckenridge's Child Development.

THE SEALRIGHT COMPANY, INC.

FULTON, N. Y. Nos. 42, 43 AND 44

"Milk Protection Is Health Protection" is the theme of Sealright's 1943 exhibit, which presents the sanitation reasons for sealing milk bottles with hoods which provide complete pouring lip protection. Also presented is the complete series of advertising messages currently sponsored by Sealright in national magazines, dramatizing outstanding accomplishments in public health achievements.

SEALTEST, INC.

NEW YORK, N. Y. Nos. 23 AND 24

The exhibit of Sealtest, Inc., a Division of National Dairy Products Corporation, will explain the work of this organization in dairy products research and inspection of ice cream, milk and dairy product production. The activities of the Sealtest Laboratory Kitchen, Consumer Service and Educational Department of Sealtest, Inc., in promoting the use of dairy products in the home will also be featured.

SHARP & DOHME

PHILADELPHIA, PA. Nos. 25 AND 26

Sharp & Dohme will have their display at Booths Nos. 25 and 26, featuring a new sulfonamide, Sulfamerazine 2-sulfanilamido-4-methylpyrimidine, "Sulfasuxidine" succinylsulfathiazole, "Lyovac" Normal Human Plasma, and biological products for active immunization. A cordial welcome awaits all visitors. Capable, well-informed representatives will be on hand to furnish information on Sharp & Dohme products.

E. R. SQUIBB & SONS

NEW YORK, N. Y. Nos. 65 AND 66

The exhibit of E. R. Squibb & Sons features the rôle that recently developed agents play in the conquest of the venereal diseases. Special emphasis will be given to Clorarsen, an effective anti-syphilitic agent, Lygranum S. T. and Lygranum C. F., antigens of chick embryo origin for use in the skin test and complement-fixation test, respectively, for lymphogranuloma venereum. Information on the chemotherapeutic agents used in the treatment of gonorrhea will be included. Members of the medical and professional service staffs will be in attendance for consultation.

STANLEY SUPPLY CO.

NEW YORK, N. Y. No. 36

The improved Davidson Incubator for Premature Infants will be featured. This unit is completely oxygenated and humidified. Be sure and ask for a demonstration of the Davidson Incubator.

WALLACE & TIERNAN CO. INC.

NEWARK, N. J. No. 73

Because of war conditions the Wallace & Tiernan Exhibit will be confined to photographic displays of their various chlorinating and water treatment devices in actual use.

WHITE LABORATORIES, INC.

NEWARK, N. J. No. 5

Within recent years tremendous advances in vitamin research have added a wealth of clinical data to our knowledge of nutrition.

The intense interest of the laity in the vitamins—often, unfortunately, confused and misled by unauthoritative lay advertising and uninformed "information"—can be properly controlled by the physician's interpretation of the actual usefulness of the vitamins to his patients.

In Booth No. 5, White Laboratories, Inc., presents its complete line of ethically promoted, clinically reputable vitamin preparations. Qualified representatives are in attendance to discuss with you the use of White's products in vitamin prophylaxis and therapy. Descriptive literature is available for your review, and a cordial welcome awaits you.

WINTHROP CHEMICAL COMPANY, INC.

INDUSTRIAL DIVISION

NEW YORK, N. Y. No. 47

Headquarters for information concerning ROCCAL and allied cationic, germicidal detergents. Increased use of ROCCAL during the past two years in food processing plants, dairies, restaurants, and in many other applications, has given a fund of new data which should be of interest to every health officer and sanitarian.

Technical attendants at the booth will be very happy to discuss bacterial problems and make specific recommendations for solving these problems through the use of cationic detergents.

WYANDOTTE CHEMICALS CORPORATION

WYANDOTTE, MICH. No. 20

The same safe, speedy Wyandotte Products used by the Armed Forces will be featured. Wyandotte Steri-Chlor for germicidal operations; Wyandotte G.L.X. for equipment cleaning; Wyandotte Canners Alkali for alkaline peeling before dehydration; Wyandotte Alkalies for bottle washing; Wyandotte Keego, Cherokee, and Poma for dishwashing operations; Wyandotte Calcium Chloride for dustlaying.

The following Wyandotte Representatives will attend: V. R. Jones and P. W. Soderberg of the home office, Sales and Technical Service, Wyandotte; and A. J. Bettelheim of the New York office.

AMERICAN PUBLIC HEALTH ASSOCIATION BOOK EXHIBIT

CONDUCTED BY THE NATIONAL HEALTH
LIBRARY FOR THE A.P.H.A.
BOOK SERVICE

CONFERENCE ROOM 7

There will be on display several hundred of the newer public health books of all publishers. Books in all public health categories will be included, classified under the following heads:

Preventive Medicine and Public Health
Laboratory
Food and Nutrition
Vital Statistics
Public Health Engineering
Industrial Hygiene
Mental Hygiene
Social Hygiene and Eugenics
Tuberculosis
Personal Hygiene
Child, Maternity and School Hygiene
Health Education
Nursing
Reference, Medical History, etc.
A.P.H.A. Publications

A five-foot shelf of basic books for public health workers will be featured. Members of the National Health Library staff will be on hand to answer questions, to make recommendations, and to provide information about books, the A.P.H.A. Book Service, and about the National Health Library Services.

HEALTH EDUCATION CENTER

CONFERENCE ROOM 8

The Health Education Center will be conducted again this year by the National

Publicity Council for Health and Welfare Services (formerly Social Work Publicity Council). The Center will be open to all delegates for study and consultation.

A library of indexed portfolios will be at hand containing outstanding examples of all types of health educational material: folders, pamphlets, radio scripts, annual reports, photographs, bulletins, and news releases.

Some of the portfolios will contain a miscellany of material in a particular medium. But a majority of them will contain collections of material in every medium on subjects that relate directly to the major topics of discussion at the conference. Sample titles are: "Rationing and Its Effect on the Diets of Mothers and Children," "The Community's Responsibility for Adequate Sanitation Measures," "Diseases of Special Importance in Wartime." Wherever possible, portfolios will not only contain samples of printed publicity materials, but will also include descriptions of how communities were organized for special projects in health education, with statements of how the printed materials were distributed and used.

In addition to the portfolios on display at the Health Education Center, the Publicity Council's entire library at its New York offices will be available to delegates. This library contains samples of publicity and health education material in every medium, and on every subject of interest to health and welfare agencies. Details of these collections may be had at the Health Education Center or by writing in advance to The National Publicity Council, 130 East 22nd Street, New York, N. Y.

Health education experts will be on hand at the Center for consultation with delegates on the particular problems of their communities.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.

POSITIONS AVAILABLE

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

Tuberculosis Association in large eastern city will accept applications for position on staff as statistical research secretary. Requirements: basic training in vital statistics, ability to plan and carry out statistical studies in the field of public health. One month's vacation. Five day week, with occasional work on Saturdays. Address Box C, Employment Service, A.P.H.A.

Council of Social Agencies in large Midwestern city is seeking person to fill position of assistant secretary in its health division. Responsibilities include coordinating, planning, and promoting of adequate community health services. Involves working with medical and health agencies and organizations and with committees. Beginning salary \$3,000. Applications should indicate training and experience and references. Box R, Employment Service, A.P.H.A.

THE MERIT SYSTEM COUNCIL OF WEST VIRGINIA ANNOUNCES UNASSEMBLED EXAMINATIONS FOR THE FOLLOWING POSITIONS IN THE WEST VIRGINIA STATE HEALTH DEPARTMENT

| <i>Position</i> | <i>Salary</i> |
|--|-----------------|
| Director of Maternal and Child Hygiene | \$4,200-\$4,800 |
| Assistant Director, Maternal and Child Hygiene.. | 3,840- 4,500 |
| Director, Industrial Hygiene | 4,200- 4,800 |
| Director, Vital Statistics.. | 4,200- 4,800 |
| Director, Communicable Diseases | 4,200- 4,800 |
| Assistant Director of Communicable Diseases (Tuberculosis) | 3,840- 4,500 |
| Assistant Director of Communicable Diseases (Venereal Disease) | 3,840- 4,500 |
| Venereal Disease Consultant | 3,840- 4,500 |
| Director, Bureau of Dental Hygiene | 3,840- 4,500 |
| Director of County Health Work | 4,200- 4,800 |
| Senior Health Officer..... | 3,840- 4,500 |
| Junior Health Officer..... | 3,360- 3,840 |
| Health Officer Trainee.... | 2,400 |
| Assistant Director, Hygienic Laboratory | 2,640- 3,240 |
| Senior Bacteriologist | 1,800- 2,400 |
| Senior Serologist | 1,800- 2,400 |
| Consultant Nurse in Special Fields | 2,400- 3,000 |
| Public Health Nursing Supervisor (State level)... | 1,920- 2,400 |
| Public Health Nursing Supervisor (Local level).. | 1,800- 2,040 |
| Chief of Medical Services.. | 4,800- 5,280 |

Persons interested should make application to the Merit System Council, 212 Atlas Building, Charleston, W. Va.

Residence in West Virginia has been waived. Applications will be accepted continuously.

Wanted: Two physicians, immediate appointment, full-time venereal disease

clinician, conduct several small clinics rotating schedule. Experience preferred. Salary \$3,600 plus actual expense not to exceed \$1,200. Write State Health Department, Santa Fe, New Mexico.

Announcement is made of the following examinations to be held by the State Personnel Board, Seattle, Wash., for positions in the State Department of Health and County Health Departments:

| Position | Salary Range | |
|---|--------------|---------|
| | Entrance | Maximum |
| Bacteriologist B..... | \$160 | \$190 |
| Laboratory Helper D... | 120 | 140 |
| Laboratory Assistant C | 140 | 160 |
| Laboratory Technician | 140 | 170 |
| District Public Health Officer V | 380 | 440 |
| Public Health Nurse B | 160 | 190 |
| Asst. Venereal Disease Investigator B | 160 | 190 |
| General Sanitarian A... | 190 | 220 |
| Milk Sanitarian A..... | 190 | 220 |
| Chief of Public Health Education | 280 | 320 |
| Senior Milk Sanitarian.. | 220 | 250 |
| Obstetric Consultant VI | 440 | 500 |
| Pediatric Consultant VI | 440 | 500 |
| Senior Bacteriologist A | 190 | 220 |

The Board of Health, Territory of Hawaii, announces applications will be received for positions as Medical Technician in their public health laboratories. The positions: Civil Service Classifications, SP-5, salary range \$154.17 to \$192.92 per month; SP-6, \$172.50 to \$217.50 per month, subject to retirement deductions under Hawaiian Civil Service System, plus graded bonus for the period of time such bonus remains in effect for Territorial Government employees.

Interested persons may make written application to Board of Health, Territory of Hawaii, P. O. Box 3378, Honolulu, T. H.

Wanted: Laboratory technician, tuberculosis hospital, 130-150 beds. Salary \$175 per month and full maintenance. Opportunity to do research. Nice surroundings, good living quarters. Write Dr. Paul D. Crimm, Boehne Hospital, Evansville, Ind.

Physician—public health pediatrics. To assist director of maternal and child health in large California County Health Department. Major duties, conducting of

infant and preschool health conferences and school examinations. Beginning salary \$350 and travel allowance. California license required. Training and experience in pediatrics or public health or both. Immediately available. Address William C. Buss, M.D., Kern County Health Department, Bakersfield, Calif.

Wanted: A physician trained in tuberculosis to assume administrative control of the Bureau of Tuberculosis in an eastern city of 200,000 population. Salary \$3,900-\$4,500 plus cost of living adjustment. Address Box B, Employment Service, A.P.H.A.

Wanted: Competent, thoroughly trained bacteriologist, woman or draft exempt man to take complete charge of splendidly equipped small industrial laboratory, Connecticut location, country environment, pleasant surroundings, excellent working and living conditions. Must have Ph.D. training or equivalent. Apply Box D, Employment Service, A.P.H.A.

MERIT SYSTEM FOR PERSONNEL ADMINISTRATION IN DELAWARE will set examinations for 3 positions in the Delaware State Board of Health this summer. The positions open for examination, together with the beginning salaries, are: Deputy State (County) Health Officer (\$3,800), Pediatrician (\$3,600), and Medical Social Consultant (\$2,400).

These examinations will be unassembled, but successful candidates will be expected to appear in Delaware for an oral interview which will be a weighted part of the examination. Appointments may be expected soon after examinations are conducted.

Information and specifications as prepared for each position may be secured by communication with the Merit System Supervisor, Post Office Box 1911, Wilmington, Del. and application for examination must be made on the official form.

Sanitarian wanted: Preferably with Bachelor's degree or engineering degree, plus public health experience or training. Must have own car. Applicant with lower qualifications will be offered an opportunity to take a short, free indoctrination course. Salary \$1,920 per year with travel allowance of \$50 per month, if qualified. Apply Dist. Dept. of Health No. 6, Central Office, Newberry, Mich., Dr. Franklin.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK 19, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. A-505

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as city or county health officer or director of a bureau. A-506

Woman physician, well prepared in pediatrics, M.S.P.H. DeLamar Institute,

Columbia University, 1943, seeks employment in the field of maternal and child health, preferably administrative in pediatrics. Excellent references. A-507

Bacteriologist, 28, Iowa State College, draft immune, 3 years' experience public health laboratory. Experience in investigation and control activities on water, sewage and sanitation, as chemist and bacteriologist and serologist in syphilis and enteric diseases. L-465

Advertisement

Opportunities

WANTED—(a) Visiting nurses; must be interested in developing visiting nurse program; industrial city of about 150,000 population; efficient health department with staff of 23 nurses to carry on generalized program including inside nursing in emergencies; Middle West. (b) Public health nurses; generalized nursing program; district includes two public schools, dental clinic, infant and maternal service; town of 35,000 not far from Chicago; 10 month year; \$170 monthly. (c) Public health nurse for important position with large industrial company; Middle West. (d) Certified public health nurse; clinic and field work—largely with children; \$165; Chicago area. (e) Nurses for mobile unit visiting various communities to collect blood for blood and plasma program of state department of health; five day week; \$155, plus traveling expenses; Middle West. (f) Public health nurses; generalized program; vicinity Washington, D. C. PH8-1. Medical Bureau (Burneice Larson, Director), Palmolive Building, Chicago.

WANTED—(a) Pediatrician; county public health department; duties include routine school examinations and assisting in general pediatric program; California. (b) Clinician; venereal disease program,

southern metropolis; opportunity for securing excellent experience in dermatology, syphilology, and administrative problems connected with venereal disease program. (c) Public health physician to direct department of maternal and child health; central metropolis; immediately. (d) Woman physician; student health department; young women's college; \$300; opportunity for developing excellent health program; South. (e) Physician well trained in public health education; appointment as assistant director of school health service; Central metropolis. (f) Student health appointment; health service includes six physicians; duties consist of general practice, health examinations, consultation and counselling. (g) Physician; part-time student health appointment; opportunity for specializing in public health or some other clinical field. (h) Student health physician; state university; large enrollment of Army and Navy trainees; Midwest. (i) Staff appointment, public schools; town of 70,000; New England; \$3,700. (j) Epidemiologist, venereal disease program; appointment offers university affiliation; South. PH8-2, Medical Bureau (Burneice Larson, Director) Palmolive Building, Chicago.

Situations Wanted

PUBLIC HEALTH PHYSICIAN—B.S., M.D. degrees, eastern schools; C.P.H., Johns Hopkins; four years, health commissioner midwestern city of 60,000; three years, head department of health and physical education, state university; four years, assistant commissioner, state health department. PH8-6. For further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—Is available for executive appointment; bachelor of science and master of public health degrees; state university; eight years' executive industrial nurse, large industrial company; two years executive public health nurse. PH8-3. For further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

PUBLIC HEALTH NURSE—Is available for executive position; B.S. degree Columbia; three years, supervising nurse, state department of health; five years, field supervisor, large industrial company; four years, educational director, public health department, college of nursing. PH8-4. For further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago.

BACTERIOLOGIST—B.S., M.D., D.Sc. degrees, with majors in bacteriology; certificate in public health, eastern university; several years' teaching experience, including professorship in bacteriology and pathology; able lecturer; now interested in public health appointment. PH8-5. For further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago.

NEWS FROM THE FIELD

PROVISIONAL BIRTH AND DEATH RATES FOR MAY

The Bureau of the Census, Washington, on July 12 released figures based on reports from 42 states and the District of Columbia indicating birth rates of 20.3 for May, 1943, as against 19.4 for May, 1942. The death rates respectively were 10.5 and 10.0. The infant mortality rate for 40 states and the District of Columbia was 37.1 per 1,000 live births for May and 5.6 per cent lower than the rate for the corresponding month of 1942. For the first 5 months of 1943 the infant mortality rate is computed as 42.5 as compared with 44.7 for the corresponding part of 1942.

Commenting on the causes for the rise in the crude death rate, the bureau states that, although exact information as to the causes is not available, an analysis of a 10 per cent sample of death certificates indicates that the rise is attributable in a large measure to deaths from diseases of older ages, namely the cardiovascular-renal diseases. Also the mortality has been higher than expected for the group of death causes including the prevalent diseases of childhood and for accidents, exclusive of motor vehicle accidents.

A COUNTY PROGRAM FOR THE PREVENTION OF DEAFNESS

According to Dr. Robert H. Riley, Director of the Maryland State Department of Health, Baltimore, Washington County, Md., has inaugurated a program for the prevention of deafness. This program was made possible through a special grant of aid to the Services for Crippled Children, Maryland State Health Department, by the

U. S. Children's Bureau. Previous surveys of school children conducted in Washington County by the Board of Education and the County Health Department revealed that 2.5 per cent of the school children in Washington County had some impairment of hearing. The present program will augment the limited facilities for otolaryngology in the community and will provide for radon therapy for adenoid tissue. The objectives of the program are: (1) Education of parents in the necessity for proper medical care for children with acute otitis media. It is planned to attain this objective through Parent-Teacher Associations, distribution of pamphlets, newspapers, preschool and school medical conferences and home nursing visits. (2) Testing of hearing in public and parochial schools. Children found with impaired hearing will be referred to the clinic. The screening test will be performed by a trained technician from the Frederick School for the Deaf. (3) Regular ear, nose, and throat clinics will be conducted by Dr. Donald F. Proctor from the Johns Hopkins Ear, Nose and Throat Clinic. Special treatment, such as tonsil and adenoid operation and mastoid operations will be done at the Washington County Hospital.

This program is under the direct supervision of Dr. W. R. Willard, County Health Officer, and has the full approval of the County Medical Society. It is a coöperative study by health agencies and medical societies and state board of education, and the private physician has an active part in the program. This program is proving to be one of the most popular programs conducted in the county.

MAINTAINING STANDARDS OF QUALITY
AND SANITARY REGULATIONS FOR
FOOD

The Association of Food and Drug Officials of the United States meeting recently in Denver announced that the Association is opposed to the principle of the lowering of standards of quality and sanitary regulations governing the production, processing, selling, and distribution of foods and food products which prevailed in the respective jurisdictions prior to the present emergency. The resolution was based on the conviction that in certain sections of the country concerted efforts have been made to lower the standards of quality and sanitary regulations governing the production, processing, selling, and distribution of foods and food products.

DR. VONDERLEHR APPOINTED TO PUERTO
RICO AND VIRGIN ISLAND POST

Raymond A. Vonderlehr, M.D., who for 8 years has served as Assistant Surgeon General in charge of the Division of Venereal Diseases of the U. S. Public Health Service, has been appointed, as of July 12, Director of District 6 of the U. S. Public Health Service covering Puerto Rico and the Virgin Islands. Dr. Parran, the Surgeon General, has pointed out that

... while serving as Assistant Surgeon General Dr. Vonderlehr has seen the national effort against the venereal diseases expand from a rear-guard action with limited funds and personnel to an all-out attack in every state, in every large city and in a majority of rural counties. The stimulus of the Venereal Disease Control Act of 1938 has resulted in a nation-wide expansion of facilities and services for the eradication of syphilis and gonorrhea. Appropriations from all sources for venereal disease control work have increased from a few hundred thousand dollars in 1935 to over 18 million dollars in 1943.

Succeeding Dr. Vonderlehr, the appointment of Dr. J. R. Heller, Jr., as Assistant Surgeon General has been announced. Dr. Heller joined the regular

corps of the Public Health Service in 1934, has served in charge of venereal disease activities with headquarters in New Orleans, La., and more recently has been serving as assistant chief of the States Relations Division of the Public Health Service.

DESIGN FOR A HEALTH FLAG

William S. Bailey, Health Officer of Irvington, N. J., has announced that he has obtained Letters Patent for a design for a health flag symbolizing the health movement.

The design consists of a blue background on which a white cross is imposed and over which a red letter H is superimposed.

It is understood that Mr. Bailey plans to make the flag available through arrangements with a manufacturer.

THE LESLIE DANA GOLD MEDAL AWARDED
TO DR. LANCASTER

The National Society for the Prevention of Blindness has announced that the Leslie Dana Gold Medal, awarded annually for outstanding achievements in the prevention of blindness and conservation of vision, will be presented this year to Dr. Walter B. Lancaster of Boston. The selection was made by the St. Louis Society for the Blind, upon recommendation of the Association for Research in Ophthalmology.

Although 80 years of age Dr. Lancaster is said still to be active in his practice as an ophthalmologist in Boston and vicinity where he has rendered long service in this field.

NATIONAL HEALTH LIBRARY APPOINTS
NEW LIBRARIAN

The National Health Library, which is located at 1790 Broadway, New York, N. Y., and which is jointly maintained by the agencies in the National Health Council, has announced the retirement as of July 1 of Isobel L. Towner who has been librarian since

1936. Succeeding Miss Towner the appointment of Eva R. Hawkins has been announced as librarian. Mrs. Hawkins has served as associate librarian for several years.

The attention of members and Fellows of the American Public Health Association is called to the fact that, by virtue of their membership, they are entitled to free access to the library and to counsel with the library staff.

CONFERENCE ON ORTHOPEDIC NURSING

Plans are being completed for the three-session group conference on orthopedic nursing to be held October 11 in New York, N. Y., preceding the War-time Conference of the American Public Health Association. This conference is being planned primarily for nurses actively engaged in orthopedic services. Discussion will center around plans for future adjustments in orthopedic programs.

Morning session 9:30-12:00—"Teaching Responsibilities of the Orthopedic Public Health Nurse"

Afternoon session 2:00-4:30—"Nursing Problems in the Care of Patients with War Injuries"

Evening session 7:30-9:30—"Orthopedic Disabilities of Workers in Industry"

The morning session, because of informal discussion, will be limited to 30. There will be no restrictions on the afternoon and evening sessions.

The conference will be held in the Henry Street Auditorium, 262 Madison Avenue, New York, N. Y. Registration will close October 1 and applications should be sent to Jessie L. Stevenson, Consultant in Orthopedic Nursing, Joint Orthopedic Nursing Advisory Service, 1790 Broadway, New York 19, N. Y.

CHANGES AT GENEVA EXPERIMENT STATION

Dr. Carl E. Ladd of Cornell University, Ithaca, N. Y., shortly before his death, announced that the dairy work

at the experiment station at Geneva is to be discontinued and the herd eventually disposed of. Dr. Ladd explained that budget-making officials of the state have believed that maintenance of herds at both Geneva and Ithaca was uneconomical. The termination of the research at the Geneva institution, which has been a leading dairy research institution among those in North America for many years, is understood not to affect the status of Dr. Robert S. Breed, who has long occupied the position of Chief In Research. Dr. Breed will continue at Geneva until retirement.

Dr. Ladd announced that the experiment station at Geneva will be developed and enlarged as a horticultural research institution. "Any disruption of long established lines of endeavor at an institution like the experiment station is bound to be disturbing, especially so to the individuals concerned. We must be realistic about such things, however, and when readjustments have to be made it is necessary to think in terms of the whole rather than a part. Those of us at Cornell who are charged with the administration of the experiment station at Geneva are definitely committed to a program of expansion of the work of the station along certain well defined lines."

KANSAS PUBLIC HEALTH ASSOCIATION MEETING

The Annual Meeting of the Kansas Public Health Association held in June in Emporia centered around wartime public health problems. Among the speakers from out of the state there were, from the staff of the U. S. Public Health Service, Dr. Joseph W. Mountin, Dr. L. E. Burney, Dr. Maurice A. Roe, Lilly Hagerman, R.N., and O. C. Hopkins, Sanitary Engineer; from the Children's Bureau Dr. Hester B. Curtis and Jane Nicholson, R.N.

The election of the following officers was announced: Dr. D. D. Carr, To-

peka-Shawnee County Health Officer, *President*; Dr. Henry H. Asher, Director Local Health Services, Kansas State Board of Health, *President-elect*; Janet Tidrick, R.N., Nurse Consultant, Kansas State Board of Health, *Vice-president*; Dr. Fred Mayes, Director Child Hygiene Division, Kansas State Board of Health, *Secretary*; Dr. F. C. Beelman, Secretary and Executive Officer, Kansas State Board of Health, *Treasurer*. The Executive Committee includes: Dr. John W. Turner, Wichita-Sedgwick County Health Officer; Dr. Charles A. Hunter, Director Public Health Laboratories, Kansas State Board of Health; and Ruth Henton, R.N., Ilathe, Johnson County Public Health Nurse.

CORRECTION

In the article, "Some Epidemiological Aspects of Tuberculosis Determined by Analysis of Sanatorium Records," appearing in July JOURNAL:

Table 7, page 785, should read:

| Age Group | $\frac{\text{Cases}}{\text{Population}} \times 100$ |
|-----------|---|
| 0-14 | .017 |
| 15-19 | .067 |
| 20-24 | .116 |
| 25+ | .095 |
| Total | .082 |

Last paragraph, page 784, should read:

In the age groups 0-14 and 15-19 the rates are approximately 19 and 26 times greater in the clinic population than in the general population; in older ages the rate in the clinic population is 8 to 9 times as great as that in the general population.

Conclusion 3, page 792, should read:

Practically all cases of tuberculosis are diagnosed on single examination; the rate of development of tuberculosis in patients negative on initial examination is 9 times as great as that in the general population. ROY M. SEIDEMAN, M.D.

OCD URGES RECOGNITION OF HEALTH OFFICIALS IN CIVILIAN PROTECTION ORGANIZATION

Operations Letter No. 131, of the Office of Civilian Defense, entitled "The Health Department in Civilian Protection" urges the appointment of health officers to the U. S. Defense Corps. Health officers, with their deputies, division chiefs, and sanitary inspectors, should be members of the U. S. Citizens Defense Corps in order that health and sanitation may be maintained during and after an air raid or other wartime disaster, it is stated.

Plans should be developed by health officers to assure maintenance of safe water, food, and milk supplies, disposal of wastes, sanitation at mass feeding centers, and control of communicable diseases. The *Operations Letter* recommends that health officers select volunteer health deputies for appointment to the staff unit of the Citizens Defense Corps in communities where the health department does not have sufficient personnel to provide sanitary supervision and inspection services in a war emergency.

All health department personnel must complete training in accordance with regulations of the Citizens Defense Corps before they can become members.

DR. ARTHUR THOMAS MC CORMACK DIES

Arthur T. McCormack, M.D., State Health Commissioner and Secretary of the Kentucky State Board of Health, died on August 6 in Louisville of a heart attack. He was 70 years old.

A graduate of the College of Physicians and Surgeons at Columbia University in 1896, Dr. McCormack devoted his career to public health. He became Secretary of the State Board of Health in 1912, succeeding his father, the late Dr. Joseph Nathaniel McCormack. He founded *The Kentucky Medical Journal* in 1901 and was editor and director thereafter. He organized

the School of Public Health at the University of Louisville and was its first dean. He was secretary of the Kentucky State Medical Association for more than 25 years.

Dr. McCormack was elected to membership in the American Public Health Association in 1919, to Fellowship in 1923, and to Life Membership in 1933. He served as a member of the Governing Council and of the Executive Board from 1928 to 1932. He was a Vice-President of the Association in 1933, became President-Elect in 1937, and was inducted into office as President in 1938.

TWO HOLDERS OF FORTY YEAR MEMBERSHIP CERTIFICATES DIE

The deaths of Robert Spurr Weston and John Watson Alvord, both members of forty years' standing in the Association, are regretfully recorded. Both were Consulting Engineers. Both rendered notable service throughout their long professional careers to hundreds of American communities.

Robert Spurr Weston took his degree of Bachelor of Science in 1891, and of Master of Arts in 1894 at Amherst College. Thereafter, he studied at Massachusetts Institute of Technology and at the University of Berlin. From 1912 as a member of the firm of Weston and Sampson, he served states, cities and towns in connection with water supply, water purification, stream pollution, sewerage, sewage and industrial waste treatment. He had been Vice-President of the American Society of Civil Engineers, President of the American Water Works Association, and President of the American Public Works Association. Mr. Weston was elected to membership in the American Public Health Association in 1896 and to Fellowship in 1922. He served as Vice-Chairman of the Engineering Section in 1913 and as Chairman in 1914. He was a member of the Governing Coun-

cil from 1924-1927 and was elected Vice-President of the Association in 1932.

John Watson Alvord was educated at Harvard University Preparatory School and J. W. Hunt's Normal School, Washington. He was awarded an Honorary Degree in Civil Engineering by the University of Wisconsin in 1913. He was a consulting engineer since 1894 to over 300 municipalities on sewerage works, water supply and water power, sewage disposal and appraisal boards. He was President of the American Water Works Association and a member of many engineering societies. Mr. Alvord joined the Association in 1899 and was a Charter Fellow.

SAVEL ZIMAND NAMED ACTING DIRECTOR OF THE BUREAU OF HEALTH EDUCA- TION, NEW YORK CITY DEPARTMENT OF HEALTH

Savel Zimand, who has been an administrative assistant in the New York City Health Department for 9 years has been designated by Health Commissioner Ernest L. Stebbins to be Acting Director of the Bureau of Health Education. Mr. Zimand, recently assigned to the bureau, succeeds Dr. Charles F. Bolduan, first director of the bureau and its head for many years until his retirement in August.

For six years previous to 1934, Mr. Zimand was administrative director of the Bellevue-Yorkville Health Demonstration.

WAR MANPOWER COMMISSION SAFE- GUARDS CIVILIAN NURSING

Paul V. McNutt, Chairman of the War Manpower Commission, announced on July 26 that nurses must be declared nonessential in civilian service before they can be recruited for the armed services.

Mr. McNutt stated that the Nursing Supply and Distribution Unit has become the Nursing Division of the Com-

mission's Procurement and Assignment Service with the same objectives as the divisions of the Procurement and Assignment Service now dealing with dentists, veterinarians, physicians, and sanitary engineers. They involve the recruitment of sufficient nurses to meet the needs of the armed forces and the provision of minimum adequate nursing care for the civilian population.

Recruiting of graduate nurses for the armed services will continue to be handled by the Red Cross, and recruiting of cadet nurses by the U. S. Public Health Service.

The function of the WMC is to determine whether a nurse may be released for military service, and to see that those who remain at home are so distributed as to provide adequate care for civilians.

I. Louise Baker, R.N., has been named assistant to Dr. Maxwell Lapham, executive officer of the Procurement and Assignment Service. She will be assisted by Ruth A. Heintzelman, R.N.

A.M.A. HEALTH EDUCATION

From August 2 through August 6, 29 graduate students under fellowships from the W. K. Kellogg Foundation and the supervision of the U. S. Public Health Service, spent a week of intensive observation, study and demonstration of the health education and related work of the American Medical Association at the Association's headquarters' building in Chicago.

The history, organization, and work of the association were presented in detail as well as the work of each department.

Each student was furnished with an extensive collection of reference materials and each was given opportunity for personal consultation with the head of that association department whose work most interested the student.

THE SCIENCE MOBILIZATION BILL (S. 702)

This bill, which was introduced into the Senate by Senator H. M. Kilgore, has had extended examination by the American Association for the Advancement of Science, with which the American Public Health Association stands in an affiliated relationship. Dr. Isaiah Bowman, President of the A.A.A.S., has announced that the association, through its Council, has gone on record by a vote of 146 to 5 opposing the bill according to the following statement.

After careful consideration of the purposes and provisions of the Science Mobilization Bill (S. 702), the American Association for the Advancement of Science, an organization of nearly 25,000 members (and having 187 associated and affiliated societies with a combined membership of over 500,000 persons whose interests cover broadly all the natural and social sciences) now, through its Council of about 250 members chosen from among the leaders of American science, respectfully recommends to the Senate and to the House of Representatives of the United States that the Kilgore Bill (S. 702) be not passed either in its present form or in any other form containing similar provisions.

The A.P.H.A. representatives on the A.A.A.S. Council are Abel Wolman, Dr. Eng., Chairman of the Executive Board, and Reginald M. Atwater, M.D., Executive Secretary.

Central States

LEONARD C. BATE, M.D., of Stambaugh, Mich., Director of the Iron County Health Department, was placed in charge of the unit in Ontonagon County, effective June 1. The central office of the two counties will be maintained in Stambaugh, with a branch in Ontonagon.

MARY P. CONNOLLY,* Director of Health Education for the Department of Health of Detroit, Mich., has retired after 25 years' service.

CLIFFORD C. CORKILL, M.D.,† resigned as head of the Menominee County Health Department, Menominee,

Mich., effective July 1, to enter private practice.

MADELENE M. DONNELLY, M.D., has been named Director of Health District No. 7, comprising Clare, Gladwin, and Arenac Counties, following the vacancy that occurred with the transfer of HELEN P. LANTING, M.D., M.S.P.H.,† of Gladwin, Mich., to a similar position in the Shiawassee County Health District.

STEPHEN E. GAVIN, M.D., of Fond du Lac, Wisc., has been appointed a member of the Wisconsin State Board of Health for a term expiring in 1950.

RUTH E. GROUT, PH.D.,* Minneapolis, has joined the faculty of the University of Minnesota as associate professor in the Department of Preventive Medicine and Public Health and of the College of Education, as announced by Ruth E. Boynton, M.D., professor in the department. Dr. Grout for the last year has been special consultant in health education, U. S. Office of Education in Washington, prior to which she was Senior Supervisor of Health Education with the Tennessee Valley Authority, Chattanooga, Tenn.

GUNNAR GUNDERSEN, M.D., of La Crosse, Wisc., was recently elected President of the Wisconsin State Board of Health.

FRANK J. HILL, M.D., M.P.H.,† of Bismarck, N. D., who has been Acting State Health Officer for North Dakota for the past 18 months, has been appointed State Health Officer by the North Dakota Public Health Advisory Council for a term of 4 years.

THOMAS F. MANCUSO, M.D., Assistant Surgeon, U. S. Public Health Service, reserve, who has been on assignment to the Michigan Department of Health, has been named to succeed HAROLD T. CASTBERG, M.D.,† Passed

Assistant Surgeon, U. S. Public Health Service, who has been organizing the Oregon State Industrial Hygiene Division. Dr. Castberg has been assigned to the California Bureau of Industrial Health, of which he formerly served as Acting Chief.

MRS. MEREDITH NICHOLSON, JR., of Indianapolis, Ind., has been appointed first full-time Executive Secretary of the Indianapolis Social Hygiene Association, effective July 1. Mrs. Nicholson is a member of the Indianapolis Board of Health and Charities and has long been active in social work in Indianapolis.

REGINALD C. SHERWOOD, PH.D.,† of St. Paul, Minn., Food Chemist, has been appointed by RUSSELL M. WILDER as his Assistant Chief in the civilian food requirements branch of the Food Distribution Administration at the Department of Agriculture in Washington, D. C.

MARY SOULES, M.D., M.P.H.,† who has been Assistant Director of Maternal and Child Hygiene for the North Dakota State Department of Health, Bismarck, N. D., has been appointed Director of that division, effective August 1, in place of ROBERT G. WHITE, M.D., M.P.H.* Dr. White was recently appointed Director of the Burke-Minot-Ward District Health Unit, effective August 1.

I. F. THOMPSON, M.D.,* Commissioner of Health in Racine, Wisc., was recently appointed a member of the Wisconsin State Board of Health and is serving as Vice President of the Board.

Eastern States

LEAH BLAISDELL, R.N.,* has been appointed as Director of the Henry Street Visiting Nurse Service, New York, N. Y., effective July 15. For the last 5 years Miss Blaisdell has served Henry Street as Assistant Director, previous to which time she

* Fellow A.P.H.A.
† Member A.P.H.A.

was for some years Educational Consultant in Public Health Nursing with the New York State Department of Health, Albany.

LEVERETT D. BRISTOL, M.D., DR.P.H.,* of Montclair, N. J., who was named as State Director of Health of New Jersey in July, has declined the appointment. Dr. Bristol is Health Director of the American Telephone and Telegraph Company in New York, N. Y.

GEORGE CAMPANA, M.D., M.P.H., formerly Assistant District State Health Officer in New York, and recently of New Rochelle, N. Y., has been appointed State Epidemiologist and Director of the Division of Preventable Diseases for North Dakota, in Bismarck, N. D. He received his public health training at Johns Hopkins University, and has had public health experience in New York City and State Departments, and in Delaware.

KATHERINE FAVILLE, R.N.,* who since 1937 has been Executive Director of the Henry Street Visiting Nurse Service, New York, N. Y., has resigned, according to an announcement made by the Service in July. Miss Faville is Chairman of the Committee in charge of recruitment of nurses for the National Nursing Council for War Service, New York, N. Y.

GRACE MACLEOD, PH.D., has been named in charge of a special planning committee to carry out the city nutrition program originally set up by the New York Department of Health to disseminate information in the best use of the available food supply in terms of a well balanced diet. The special planning group will be part of the Coördinating Committee sponsoring the program.

RUTH A. PARMELEE, M.D., M.P.H.,† who received her degree in public health recently from the Harvard School of Public Health, Boston, has

sailed for Syria enroute to Greece as a missionary of the American Board of Commissioners for Foreign Missions, Boston. Dr. Parmelee has served in the Near East since 1914.

Southern States

JOHN A. COWAN, M.D., M.S.P.H.,* Health Officer of Sioux City, Iowa, has been appointed Venereal Disease Officer for the Oklahoma State Department of Public Health, succeeding EUGENE A. GILLIS, M.D., M.P.H.,* Passed Assistant Surgeon, U. S. Public Health Service, who has held the position for 4 years on loan from the Public Health Service. Dr. Gillis is being transferred to Austin, Tex.

RICHARD O. C. GREEN, M.D., of Alexandria, La., formerly Director of the Rapides Parish Health Unit, has been named to a similar position with the Webster Parish Health Unit, succeeding EDMOND G. KLAMKE, M.D., M.P.H.,† of Minden.

STEPHEN V. LUDDY, D.D.S., M.P.H.,† who has been director of the Bureau of Dental Hygiene in the West Virginia State Health Department, Charleston, has resigned to accept a position with the Virginia State Board of Health, Richmond. Temporarily he is assigned to the City Health Department, Alexandria, as director of the city school dental health program. Dr. Luddy formerly was Director of the Division of Oral Hygiene in the North Dakota State Health Department.

JOHN E. OFFNER, M.D., of Weston, W. Va., has been appointed to succeed CLIFTON F. McCLINTIC, M.D.,† as State Health Commissioner of West Virginia, a position Dr. McClintic has held since 1941. Dr. Offner has for 10 years been Superintendent of the Weston State Hospital.

* Fellow A.P.H.A.

† Member A.P.H.A.

BRIGADIER GENERAL JAMES STEVENS SIMMONS,† A.U.S., Director of the Division of Preventive Medicine, Office of the Surgeon General, U. S. Army, Washington, D. C., has been appointed a member of the Visiting Committee for the Harvard School of Public Health, Boston, Mass., according to an announcement by the Board of Overseers of Harvard College.

MARTIN B. WOODWARD, M.D., C.P.H.,* Registrar, State Board of Health, Columbia, S. C., has been named as Director of the Bureau of Vital Statistics of West Virginia, succeeding FRANKLIN H. REEDER, M.D., who is in the military service. Dr. Woodward has served as Director of a similar bureau in the South Carolina Health Department for several years past.

Western States

PAUL R. ENSIGN, M.D.,† has resigned as Director of the City and County Health Unit in Boise, to accept a position as Pediatric Consultant of the Division of Maternal and Child Health of the Georgia Department of Public Health.

ALAN L. HART, M.D.,† of Boise, Idaho, Consultant in Tuberculosis for the Idaho State Department of Public Health and the Idaho Tuberculosis Association, has been granted a leave of absence by the State Department to accept a temporary assignment as roentgenologist at the induction center for the armed forces in Seattle.

CLIFFORD KUH, M.D., DR.P.H.,† has resigned as Director of the California State Bureau of Industrial Health, to join the Permanente Foundation in California.

HOWARD W. LUNDY, DR.P.H.,* formerly Professor of Bacteriology and Public Health, State College of Washington,

Pullman, Wash., was appointed Health Education Coördinator in charge of the informational section of the Division of Public Health Instruction, Illinois State Department of Public Health, Springfield.

LELAND E. POWERS, M.D.,† Health Officer of Tacoma, Wash., has been appointed Director of the Washington State Department of Health. He succeeds DONALD G. EVANS, M.D.,† of Seattle, who, according to *North-west Medicine*, will enter private practice.

HUBERT O. SWARTOUT, M.D., DR.P.H.,† was appointed Health Officer of Los Angeles County, Calif., on June 17. He had been Acting Health Officer.

JOHN W. UNIS, M.D., of Seattle, Wash., has been appointed Medical Supervisor for the Department of Social Security. He succeeds JOHN M. FLUDE, M.D., who resigned to enter private practice in California.

LLOYD E. WEBSTER, of Los Angeles, Calif., has been appointed Director of Health Activities for the Los Angeles County Board of Education.

ROBERT H. WELDING, M.D., of Ellensburg, Wash., has been named Health Officer of Kittitas County.

Hawaii

LEO BERNSTEIN, M.D.,† Passed Assistant Surgeon (R), U. S. Public Health Service, who has been Health Officer on Kauai, has been transferred to the position of Health Officer for the Island of Hawaii in the Territory of Hawaii. His address is care of the Board of Health at Hilo, Hawaii, T. H.

CONFERENCES AND DATES

American Congress of Physical Therapy—
22nd Annual Scientific and Clinical Session.
Palmer House, Chicago, Ill. September
8-11.

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Epidemiology of Epidemic Keratoconjunctivitis

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IN the summer and fall of 1941 outbreaks of epidemic keratoconjunctivitis were reported from Hawaii and from the West Coast.^{1, 2, 3} In the early part of 1942 cases were first recognized in the East in New York City.^{4, 5, 6} In the latter part of September, 1942, the disease was first recognized in upstate New York in the form of an outbreak in a large manufacturing concern in Schenectady. As the result of a survey of industrial plants conducted by the district state health officers, it was found that cases had occurred earlier that year elsewhere in New York State, the first such outbreak consisting of approximately 35 cases in two related plants in Rochester, N. Y., in July. As the histories in these cases were typical and more than half of the patients developed corneal opacities, there seems little doubt as to the diagnosis. In spite of the large number of people employed in these two Rochester plants, the infection apparently died out of itself without any special control measures being instituted. In Buffalo and

vicinity a number of industrial plants had typical cases develop among their employees at about the same time that cases appeared in Schenectady, and although the aggregate number of cases in this area was in the hundreds, no one plant apparently suffered an incidence comparable with that in the Schenectady plant. Only a few scattered cases were uncovered elsewhere in the state. Since the Schenectady outbreak apparently is the largest epidemic reported thus far in one industrial plant and was studied intensively while in progress, the remainder of this report will deal with that outbreak.

At the request of military authorities exact numbers will not be given. Suffice it to say that the manufacturing concern in question employs many thousands of employees and that the number of cases which have occurred in the plant exceeds by a wide margin the 600 cases estimated by Rieke as having occurred in the Oregon Shipbuilding Corporation Yards.³ The plant covers a large tract of land and is served

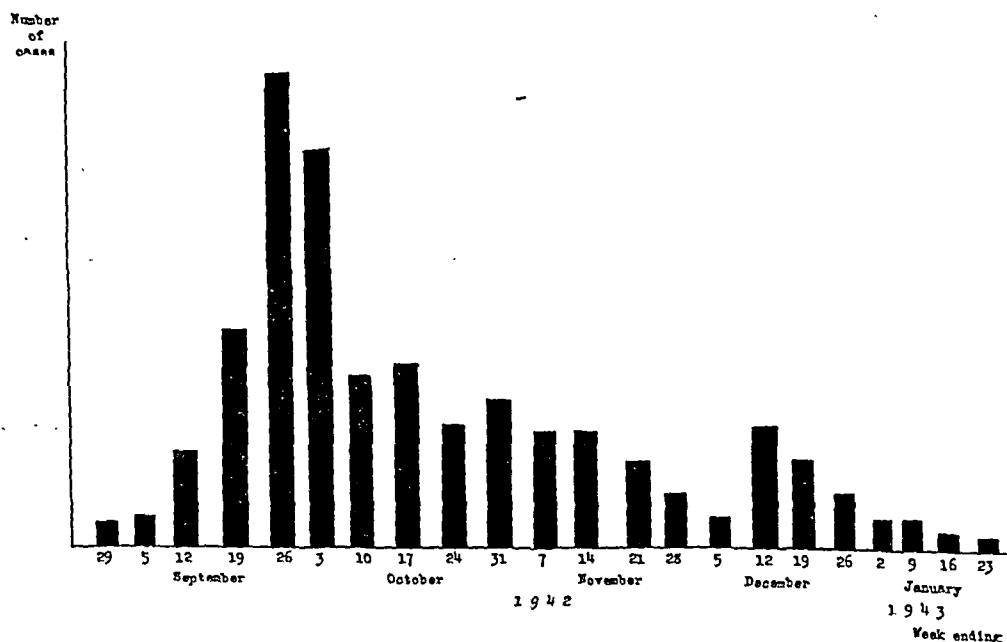
medically by a main dispensary located essentially in its center, together with a branch dispensary in charge of a physician at the east end of the plant. In addition there is a first aid room in the charge of a nurse at a subsidiary plant located elsewhere in the city.

THE DIAGNOSIS AND CLINICAL PICTURE

The cases were typical of those described in the literature^{1, 2, 3} and the diagnosis was confirmed by Drs. Murray Sanders and Alton E. Braley, of the College of Physicians and Surgeons, Columbia University, New York. Furthermore, patients with the disease were demonstrated by Dr. Murray Sanders to have developed specific neutralizing antibodies against the virus previously isolated by him from New York City cases.⁷ Although all gradations of severity were encountered, it was the general impression of visiting physicians who had seen cases

elsewhere in the United States that on the average these cases were more severe than those they had encountered elsewhere. From September 28 to October 23, inclusive, essentially every case reporting to the plant's medical department was studied intensively (comprising several hundred definite cases and referred to from this point on as the "study sample"). Among this group of patients, 56.1 per cent developed the disease in both eyes and 85.5 per cent developed corneal opacities. In those with corneal involvement, the opacities appeared between the 7th and 20th day after onset in 92 per cent. The actual distribution of cases according to appearance of opacities by 7 day periods from date of onset was as follows: 0-6 days, 7.0 per cent; 7-13 days, 65.8 per cent; 14-20 days, 26.3 per cent; 21 days and over, 0.9 per cent. In only 19 per cent had the opacities disappeared by the end of the second month after onset.

Chart 1
Epidemic Keratoconjunctivitis
Schenectady Outbreak
KNOWN CASES BY DATE OF ONSET



CHRONOLOGICAL DEVELOPMENT OF OUTBREAK

As to the chronological development of the outbreak, a study of the number of visits to the eye clinic revealed a definite rise beginning September 10. The distribution of known cases by date of onset is shown in Chart 1. Since the investigation of the outbreak was not begun until September 24, a few cases probably occurred prior to that date which were not seen and are not indicated on the chart. Furthermore, in some cases the date of onset was not determined. However, it is believed the number of such cases was not sufficiently great to affect materially the characteristics of the chart.

It will be noted from Chart 1, that some patients dated the onset of their infection in the last week of August. Cases increased precipitously to a peak in the week ending September 26. The outbreak declined less rapidly than it developed, but ultimately approached the zero line by the week ending January 23, 1943. Only a few scattered cases have occurred since that time. One might ask whether the introduction of new employees (presumably non-immune) into the plant population may not have served to keep the outbreak going. The facts, however, do not support this theory, since study of all the cases with onsets from December 1 through March 13 fails to show any who had been employed at the plant less than 6 months.

The manner of introduction of the infection into the plant could not be ascertained. During the previous spring a number of cases of conjunctivitis had occurred among the employees, but corneal opacities did not develop in these cases nor were the other diagnostic characteristics present. The plant's ophthalmologist stated definitely that clinically the cases which occurred that spring were not the same disease which appeared in the fall. Furthermore, no

neutralizing antibodies were found in serum from one of these patients, 5 months after onset. The number of such cases was so small that the total number of visits to the eye clinic during those months was not appreciably affected. This is in contrast with the marked increase in total visits in the fall because of the appearance of epidemic keratoconjunctivitis.

An intriguing lead was encountered when it was learned that a fairly large corps of employees had been sent to the Hawaiian Islands in March, 1942, to help repair the damage at Pearl Harbor. However, it was found that all but two of the group returned to Schenectady after October 21, 1942; that is, some time after the peak of the epidemic keratoconjunctivitis outbreak had been passed. None of the group had developed epidemic keratoconjunctivitis nor, in fact, were they aware of any cases in Hawaii. The two men who returned prior to October 21 arrived in August and the first week of September, respectively. Although the possibility that the employee returning in August was a passive carrier cannot be definitely refuted, it seems rather absurd to attempt to attribute the outbreak to this man, in view of the presence of the disease earlier that year in New York City and elsewhere in the state, the hiring of many new employees from various parts of the United States, and the transferring of employees back and forth between the Schenectady plant and plants of the concern located elsewhere in the country.

GEOGRAPHICAL DISTRIBUTION OF CASES

The geographical distribution of the cases did not assist in determining the manner of introduction of the infection and direction of spread. A spot map of known cases made on the first day of investigation (September 24) revealed that cases had already been reported from essentially every building

in the plant; and an analysis later by date of onset showed almost simultaneous appearance of the disease in many buildings. Certain buildings, however, suffered attack rates somewhat higher than others. There appeared to be no particular geographical concentration of the buildings with the lower attack rates except that essentially all of the buildings at the east end of the plant had proportionately fewer cases. These buildings are mostly office buildings and are served by the branch dispensary.

TABLE 1

*Epidemic Keratoconjunctivitis
Schenectady Outbreak*

Attack Rate for Each Sex by Type of Building

| Type of Building | Attack Rate Per cent | | |
|----------------------|-------------------------|--------|------------|
| | Male | Female | Both Sexes |
| Entire plant | 1.3 | 0.5 | 1.1 |
| Selected buildings: | | | |
| Heavy manufacturing | 2.7 | ... | 2.6 |
| Light manufacturing | 1.1 | 1.1 | 1.1 |
| Light assembly | 0.6 | 0.4 | 0.5 |
| Exclusively clerical | 0.3 | 0.2 | 0.3 |

In Table 1 buildings have been combined according to whether they represent heavy manufacturing, light manufacturing, light assembly work, or exclusively clerical work, and attack rates have been calculated on the basis of the study sample defined above. It will be noted that employees in the buildings representing heavy manufacturing (manufacture of massive steel structures involving welding, gas cutting, planing, etc.) suffered the highest attack rate, with progressively lower attack rates occurring among those engaged in light manufacturing, light assembly work, and exclusively clerical work.

This table also is of interest from the standpoint of the sex distribution of cases. The great majority of cases occurred among males, but the great majority of the plant population con-

sists of males. However, even on an attack rate basis, it was noted that for the entire plant the males suffered an attack rate over twice that for females. When these sex specific attack rates are broken down according to buildings grouped by type of work, the sex difference essentially disappears and the difference with regard to the entire plant is due chiefly to the fact that few women are employed in the buildings involving heavy manufacturing processes.

OCCUPATION, AND POSSIBLE ROLE OF
FOREIGN BODY IN THE EYE

This brings up the question as to the rôle of foreign bodies in the eye as a predisposing factor in the development of the clinical illness. Determining the existence of such a relationship and distinguishing it from the possible rôle the eye dispensary might have played in dissemination of the infection are very difficult problems. The first symptom of the disease may simulate that of a foreign body and at first the patient may think that he merely has something in his eye. If such a person goes to the eye dispensary because of this sensation and then shortly afterward develops the rest of the symptoms of the disease, he may get the erroneous impression that he acquired his infection at the eye clinic. Even in the case of actual removal of a foreign body from the eye in the dispensary several days before development of the disease, the subsequent appearance of epidemic keratoconjunctivitis might have been due to a predisposing rôle played by the trauma of the foreign body rather than infection of the eye acquired in the clinic during the process of removing the foreign body.

Determining attack rates by occupation is of some assistance in attacking this problem. Using the study sample to calculate attack rates by occupation, the figures indicated in Table 2 are ob-

TABLE 2
Epidemic Keratoconjunctivitis
Schenectady Outbreak
Incidence according to Type of Work

| <i>Type of Work</i> | <i>Attack Rate</i> <i>Per cent</i> | | <i>Type of Work</i> | <i>Attack Rate</i> <i>Per cent</i> | |
|--------------------------------|---------------------------------------|--------------------|-----------------------------|---------------------------------------|--------------------|
| | <i>Total</i> | <i>No. Visit *</i> | | <i>Total</i> | <i>No. Visit *</i> |
| Physicians, nurses | 31.3 | 25.0 | Stockroom keepers | 1.7 | 1.1 |
| Welders, cutters | 6.5 | 3.5 | Truck drivers | 1.7 | 1.2 |
| Solderers, babbitters | 6.3 | 2.7 | Supervisors | 1.5 | 0.9 |
| Crane followers | 5.5 | 3.0 | Receivers, shippers | 1.2 | 1.2 |
| Chippers, filers, grinders | 3.9 | 2.8 | Assemblers | 1.2 | 0.6 |
| Sheet metal workers | 3.4 | 2.0 | Laborers, porters | 1.1 | 0.4 |
| Painters, varnishers | 3.3 | 3.3 | Winders | 1.0 | 0.6 |
| Policemen | 3.1 | 2.2 | Platers, dippers, polishers | 0.7 | 0.7 |
| Maintenance and repair workers | 2.9 | 1.6 | Miscellaneous | 0.7 | 0.3 |
| Machine and press operators | 2.0 | 1.2 | Engineers | 0.6 | 0.5 |
| Testers | 1.9 | 0.7 | Clerks | 0.4 | 0.3 |
| Tool and die makers | 1.8 | 1.1 | Draftsmen | 0.1 | ... |

* i.e., exclusive of those having visited the eye clinic 3-14 days prior to onset of the epidemic keratoconjunctivitis

tained. A striking feature of this table is the high attack rate among dispensary physicians and nurses, indicating the communicable nature of the infection under conditions of intense exposure. Upon studying the attack rates among the other occupations, it would appear that higher attack rates were sustained by employees in occupations more apt to result in eye trauma. However, since this might merely mean more frequent visits to the eye dispensary where infection might be acquired, a parallel row of rates has been calculated in which all cases have been omitted in which there was a history of a visit to the eye dispensary from 3 to 14 days prior to onset. Essentially the same relationships are maintained in this second series of rates. Offhand, this would seem to indicate a relationship to occupation, per se, but as will be discussed later there may be another explanation.

Not indicated in this table is the fact that workers on the night (second and third) shifts had attack rates almost twice as high as those on the day shift. This is explainable by the fact that the night shifts include a relatively greater proportion of workers in occupations

with higher attack rates. Possibly the presence of the infection in a male nurse handling some of the eye cases at night had a bearing on this problem. This individual continued to work during his illness. The total number of cases in persons on the night shifts was not large enough to influence appreciably the occupational distribution of the total group of cases.

Also not indicated in Table 2 was the high attack rate (5 among 11 men, or 45.4 per cent) in volunteer night firemen, whose daytime jobs were various and widely scattered, but who at night congregated at the firehouse and slept in a dormitory. It happens that these sleeping quarters are on the second floor of the main dispensary, but it is not believed that this indicates any causal relationship. It is felt that the high attack rate among these firemen was probably due to their prolonged and intimate contact with each other following the introduction of a case into their midst. No case occurred among the 8 professional firemen on day duty only.

To assist further in the solution of this problem, histories were secured from a series of several hundred em-

TABLE 3
Epidemic Keratoconjunctivitis
Schenectady Outbreak
Comparison of Some Possibly Predisposing Factors among
*Cases Compared with Sample Population **

| <i>Possibly Predisposing Factors</i> | <i>Per cent among</i> | | <i>General Population *</i> |
|--|-----------------------|--------------------|-----------------------------|
| | <i>E.K. Cases</i> | | |
| | <i>Total</i> | <i>No. Visit †</i> | |
| Work necessitates looking at bright light | 19.7 | 16.9 | 20.1 |
| Work involves close work with eyestrain | 24.1 | 21.2 | 43.4 |
| Work often results in foreign bodies in eye | 38.9 | 35.6 | 16.5 |
| Work involves wearing goggles | 40.6 | 40.2 | 19.2 |
| Visited Main Dispensary eye clinic within 14 days of onset in cases, or within past 14 days in sample population | | | |
| — for foreign body in eye | 34.4 | .... | 5.3 |
| — for other eye complaints | 13.9 | .... | 3.5 |

* Histories from employees coming to dispensaries because of common cold

† Indicates no visit to eye clinic at the Main Dispensary within 3-14 days prior to onset

ployees reporting consecutively to the dispensaries because of the common cold. This was for the purpose of securing data for the plant population as a whole to be used for comparison with the data secured on the history sheets for the epidemic keratoconjunctivitis cases. This method of sampling the employee population was decided upon when plant officials deemed it impractical to obtain the data by interviewing every one-hundredth person on the pay roll. The sex distribution of these common cold cases (21 per cent females) agreed well with the sex distribution of the plant population as a whole (23 per cent females), and the distribution by buildings also agreed well with the distribution of the employee population as a whole. The investigation of the study group of epidemic keratoconjunctivitis cases preceded in time the survey of workers with the common colds. However, the average daily number of visits to the dispensary for foreign bodies in the eye was essentially the same in each period (219 and 250, respectively). It seems reasonable, therefore, to assume that the data with regard to the cold survey group can be considered representative of the general plant employee popula-

tion for purposes of comparison with the epidemic keratoconjunctivitis study group. Some of these comparisons are given in Table 3.

First, let it be noted from this table that in over half of the cases (51.7 per cent) the patients gave no history of having visited the eye clinic within 14 days prior to onset. It is obvious, therefore, that the eye dispensary was not the principal direct means of dissemination of the infection. A similar observation was made by Rieke in the Oregon cases.³ However, that such dissemination can occur has been demonstrated by Sanders⁶ in his investigation of 80 cases of the disease in New York City in which transmission apparently occurred through an ophthalmologist's office.

From Table 3 it seems clear that work which involved looking at a bright light, or close work with eyestrain, did not predispose to the development of epidemic keratoconjunctivitis, since the per cent of the general employee population engaging in such work was essentially the same or greater than among employees developing epidemic keratoconjunctivitis. The higher per cent among the general employee population giving a history of close

work involving eyestrain is explainable by the greater proportion of clerks and stenographers in this group. When it comes to work likely to result in foreign bodies in the eye and work involving the wearing of goggles, one notes a definitely higher percentage with a history of such work among those who developed the disease, compared with the average employee. When one considers the question of a previous visit to the main dispensary eye clinic, the discrepancy between the two groups is even more pronounced. Even when visits to the eye clinic for conditions other than a foreign body are considered, there is a significant discrepancy.

FOREIGN BODY VERSUS DISSEMINATION
BY EYE DISPENSARY

An association between the acquiring

of foreign bodies in the eye and the development of epidemic keratoconjunctivitis is indicated from Chart 2. In this chart the epidemic keratoconjunctivitis attack rates have been arranged in order according to various buildings, and on the same chart has been plotted the per cent of the workers in each of these buildings who visited the main dispensary eye clinic in July because of a foreign body in the eye (prior to the appearance of epidemic keratoconjunctivitis in the plant). The general correlation is obvious. (In this calculation only buildings with employee populations exceeding 2 per cent of the total employees have been considered, since rates based on smaller numbers would be capricious.)

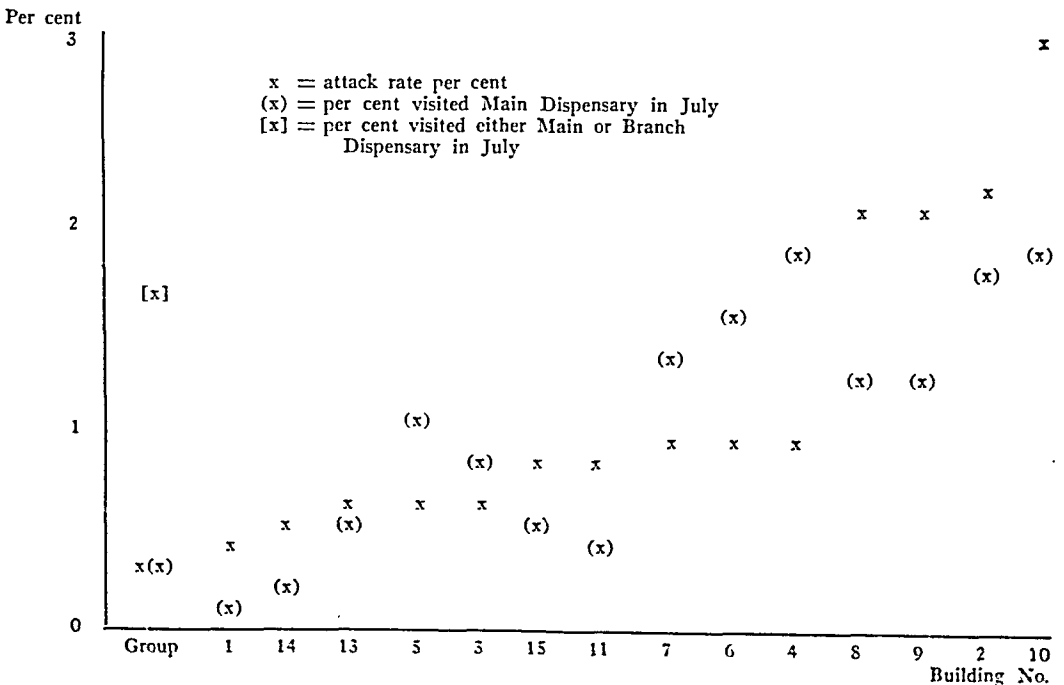
It should be noted that as stated this diagram represents visits to

CHART 2

Epidemic Keratoconjunctivitis

Schenectady Outbreak

Apparent Correlation between Epidemic Keratoconjunctivitis Attack Rate and Visit to Main Dispensary because of Foreign Body in Eye



the eye clinic in the *main* dispensary. The building marked "group" on the diagram is a combination of the buildings in the east end of the plant, where the branch dispensary is located, and represents about one-fifth of the total plant population. If the visits in July to the branch dispensary for foreign bodies in the eye are added to the visits to the main dispensary, 1.7 per cent of the employees in this group of buildings visited a dispensary in July for this reason, as indicated by the cross in brackets, which now obviously throws this group out of line. Although the figures upon which these percentages are based cannot be recorded here, it should be said that this alteration in the per cent of visits for foreign bodies in the eye made by the "group" is highly significant statistically. This finding has at least two possible explanations: first, that the types of foreign bodies acquired by the workers (largely clerical) in this group of buildings did not predispose to the development of the disease to the same extent as foreign bodies acquired elsewhere in the plant; or second, that treatment for a foreign body in the branch dispensary was less likely to result in infection than was similar treatment at the main dispensary. In this connection it was observed that routine technics followed by the branch dispensary appeared much less likely to result in the transmission of infection from one eye case to another, than were the technics followed in the main dispensary. Due to the nature of the records it was impossible to calculate for comparison epidemic keratoconjunctivitis attack rates among those consulting the main versus the branch dispensaries because of foreign bodies in the eye.

In an attempt to differentiate between foreign body as a predisposing factor in itself and acquiring the infection by a visit to the main dispensary

eye clinic, the per cent of epidemic keratoconjunctivitis cases giving a history of having visited the eye clinic within 3 to 14 days prior to onset were calculated according to the week of onset. The thought in so doing was that if the eye clinic was serving as a means of dissemination, the per cent of cases giving a history of having visited the eye clinic within 3 to 14 days prior to onset would increase as the epidemic got under way. The cases for the weeks ending August 29 and September 5 were too small in number to permit reliable percentages. For the weeks ending September 12, 19, 26, and October 3, the per cents giving a history of having visited the eye clinic 3 to 14 days prior to onset were, respectively, 7.2 per cent, 32.8 per cent, 36.3 per cent, and 47.0 per cent.

CONTROL MEASURES AND IMPLICATION AS TO MODE OF SPREAD

Before the intensive investigation of the epidemic was initiated, the plant authorities, suspecting that the eye solutions used in the dispensary might have been at fault, had studied them bacteriologically and had attempted to interrupt possible spread through this means by replacing them with fresh solutions. Starting September 28, a separate room was established in the main dispensary for the handling of epidemic keratoconjunctivitis cases, and all doubtful cases were referred to this room where rigid aseptic technic was used. The importance of applying equally as stringent technic to the routine eye cases, made up largely of foreign bodies, did not become evident until later, and then because of the tremendous patient load being carried by the dispensary, due in turn to the enormous increase in the number of employees, it took a little time to put the recommended changes into complete effect. As a result, procedures which would stand critical scrutiny from a

bacteriological standpoint were not actually instituted for every eye case visiting the dispensary until December 17. These procedures consisted principally of thorough washing of hands routinely between patients, using a separate sterilized dropper for each patient, and frequent sterilization of instruments and solutions.

In view of this date (December 17) it is of interest that although in the 4 calendar weeks from November 29 to December 26, inclusive, 47.9 per cent of the cases gave a history of having visited the eye clinic 3 to 14 days prior to onset, during the next week (December 27 to January 2) this per cent dropped to 33.3 per cent, and from then until the end of the period of observation (March 13) none of the cases gave such a history. As a matter of fact, in each of the few cases occurring subsequent to December 17 in which there was a history of prior visit to the eye clinic, that visit had been made before December 17. Thus there was no evidence that after December 17 the eye clinic could possibly have been responsible for dissemination of the infection, in contrast with earlier data.

SECONDARY CASES IN HOUSEHOLDS

A study was also made of members of the households of patients. All alleged attacks among household members were confirmed or rejected by personal visits to the home. Among those households in which observation was continued for 28 days from onset in the original case, 4.9 per cent of the household members developed the disease. This corresponds roughly to the incidence among the employees, which was 4.1 per cent, as estimated from the study of the common cold sample. Rieke made a similar observation in the Oregon cases. He states: "Also notable was the rather spotty extension of infection to the workmen's families, the

percentage incidence roughly paralleling that among the men."³ In the secondary household cases in the Schenectady outbreak, the great majority of the household secondary cases occurred among adult females, as one might expect, in view of the fact that the great majority of cases in the plant occurred among adult males. Even on an attack rate basis adult females in the households experienced the highest rate; among household members over 15 years of age, females experienced an attack rate of 7.2 per cent compared with 1.1 per cent attack rate among males. As to children in the families, 3.9 per cent of the girls and 3.3 per cent of the boys developed the disease. It was observed that in general the illnesses were milder in the children.

Secondary cases among household members were most likely to have their onsets during the 2nd and 3rd week after onset in the primary case. The attack rates in the 1st, 2nd, 3rd, and 4th weeks after onset in the primary case were 0.17 per cent, 1.2 per cent, 1.4 per cent, and 0.8 per cent, respectively. In one instance a case occurred 32 days after onset in the primary case, the longest interval encountered, and which, of course, might have been the result instead of some unknown extrahousehold exposure.

Several cases among household members were of special interest. In one instance spread continued through one family to another related family. In another family there were 3 secondary cases. In still another the flow of infection seemed reversed; the wife of the plant worker developed the disease after going to a local ophthalmologist for a dacryo-cystitis, and her husband subsequently developed the disease. In a fourth instance, a woman developed the disease, although with no known exposure. However, 4 other members of the family worked at the plant in question.

CASES ELSEWHERE IN THE CITY

As to incidence in the community, no cases appear to have been observed in residents of the city prior to the appearance of cases in the plant. Another large manufacturing plant in the city, employing about one-fourth the number of workers in the first concern, experienced a wave of epidemic keratoconjunctivitis among its employees which, however, was distinctly secondary, chronologically, to the first outbreak. In an attempt to avoid the experience of the first plant, this concern instituted a policy of supposedly rigid exclusion from work of all employees developing the disease until 2 weeks after onset. Despite this policy, their employees suffered an attack rate roughly comparable with that in the first concern.

DISCUSSION

The situation in the last of the households discussed above suggests the existence of carriers, since the woman who developed a typical attack of the disease was not employed in the plant and had no other known exposure to a case, and yet there were 4 members of the household who were workers in the plant. Although none of these workers had any symptoms suggestive of the disease, it seemed possible that they might have brought the infection home. Accordingly, blood specimens from the case and 3 of the family members were collected 6 months after onset in the case and submitted to Dr. Murray Sanders for study. The findings are of considerable interest, since sera from each of the 4 persons showed 1,000 neutralizing doses to the virus isolated by Dr. Sanders. The widespread distribution of cases in the plant as early as September 24, taken in conjunction with the small percentage of the employees suffering clinical attacks of the disease, further suggest that the virus may be readily transmitted from person to person (respiratory?), but that only

a small percentage of those becoming infected develop a clinical attack. Serological studies of atypical cases and household contacts and plant employees who failed to acquire the clinical illness are being made and may throw some light on this problem.

If this conception that clinical cases represent just a fraction of the total number of infected individuals is correct, the question then arises as to what factors predispose to development of the clinical infection. The three usual factors may be considered, namely, variation in virulence of the virus, variation in dosage, and variation in resistance of the host. There is no evidence as to variation in the virulence of the virus. There was a clinical impression that cases became more mild as the outbreak progressed, which would be contrary to the usual experience with repeated passage of a virus. However, it seems more likely that this impression was a false one due to the fact that the outbreak had been under way several weeks before investigation was started, so that among the cases with onset in August or early September, only the more severe cases were still showing acute symptoms when the investigation commenced. There may also have been the factor of a greater tendency later in the outbreak for the milder cases to report to the clinic, in response to publicity and instructions.

As to dosage, the high attack rate among physicians and nurses employed in the dispensary and the high attack rate among adult females in the households of patients would seem to indicate that more intense exposure is more likely to result in development of the clinical disease. In none of the cases developing among household members was there a history of a foreign body during the 2 weeks prior to their onset. This was also true, with one exception, among the physicians and nurses who acquired the disease. The experience

among the volunteer night firemen further indicates the important rôle of intimate contact in spread of the infection.

As to factors influencing resistance in the host, the variation in rate according to occupation, with cases omitted which might possibly have been instances of infection acquired at the eye clinic, suggests offhand that some factor related to occupation might have altered resistance to the virus. One is immediately impressed with the higher attack rates in those occupations in which the eye is more likely to be traumatized, and it would seem reasonable that trauma to the eye might result in reducing resistance to invasion of the virus. That there was a relationship between the likelihood of acquiring ocular foreign bodies and the development of the disease was demonstrated by the correlation by buildings between frequency of reporting to the eye clinic for foreign bodies in July, prior to the outbreak, and the epidemic keratoconjunctivitis attack rates. Also of interest in this connection is the higher percentage of the epidemic keratoconjunctivitis cases giving a history of engaging in work involving the likelihood of developing foreign bodies in the eye, wearing goggles, and of prior visits to the eye clinic, in contrast with the sample of the employee population. At least part of this difference, however, could be due to dissemination of the infection through the eye clinic, and other evidence would seem to indicate that such dissemination in the eye clinic did play a rôle in the spread of the infection among employees. There is the possibility, moreover, that the difference in rates by occupation is merely a reflection of dissemination through the eye clinic, since such transmission would result in an earlier and heavier seeding in the occupational groups reporting more frequently to the eye clinic and thus, in turn, result in

greater spread to fellow workers through contact.

Referring to the cases observed in the industrial plants in Rochester and Buffalo, the routine technics practised in the Rochester plants were very good from an aseptic standpoint, and may have contributed to the infection's dying out so promptly in those plants. As to Buffalo, in a disproportionately large number of the cases scattered among various plants, there was a history of a prior visit to a certain few ophthalmologists' offices, suggesting dissemination of infection through these offices.

SUMMARY

Epidemic keratoconjunctivitis appeared in New York State in 1942, first in New York City and later in scattered areas in upstate New York.

An unusually extensive outbreak, apparently the largest to be reported thus far in a single plant, occurred in a manufacturing concern in Schenectady.

Following a rapid rise in the number of cases in September, the outbreak declined, leveling off to a fairly high incidence which was maintained until particularly rigid aseptic technics were instituted in the eye clinic; subsequently new cases decreased to negligible proportions. Approximately 4 per cent of the employee population was affected with a definite attack of the disease, and approximately the same proportion of household members of patients developed the infection after onset in the primary case.

An occupational selection was demonstrated which seemed correlated with the likelihood of eye trauma, but which may have been a reflection of the rôle played by the eye dispensary in dissemination of the infection.

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A Practical Study of Lauryl Sulfate Tryptose Broth for Detection of the Presence of Coliform Organisms in Water*

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THE studies, initiated by the Committee on Standard Methods in 1934, of media proposed for detection of the presence of coliform organisms in water, the results of which have been reported at various times (1935,^{1,2} 1937,³ and 1939⁴), were continued during the past two years by conducting a practical test of another medium, lauryl sulfate tryptose broth, proposed by W. L. Mallmann and C. W. Darby.^{5,7}

THE MEDIUM

The composition of the medium tested was the following:

| | <i>Grams</i> |
|---|--------------|
| Bacto-tryptose | 20 |
| Bacto-lactose | 5 |
| Potassium phosphate dibasic | 2.75 |
| Potassium phosphate monobasic | 2.75 |
| Sodium chloride | 5 |
| Sodium Lauryl Sulfate (Duponol WA Flakes) | 0.1 |

The ingredients were dissolved in 1 liter of cold distilled water, distributed into tubes and autoclaved at 15 lbs. pressure for 15 minutes. The final pH was approximately 6.8.

In this medium, tryptose was employed, instead of peptone, because of its better productivity and selectivity; and sodium lauryl sulfate was included because of its selective effect, somewhat similar to that of some other surface tension depressants such as oxgall, in inhibiting the multiplication

of certain non-coliform organisms.

Cowles⁶ first proposed the use of sodium lauryl sulfate for this purpose. Mallmann and Darby⁷ employed it in their preliminary work in the form of Duponol W. A. Paste,* a commercial product used as a detergent and wetting agent in the textile and other industries. A similar product, Duponol W. A. Flakes,† containing a somewhat larger proportion of sodium lauryl sulfate, was employed in the present study because of its apparently greater stability.

OUTLINE OF THE WORK

The medium described was distributed, in dehydrated form, through the courtesy of Difco Laboratories, Detroit, Mich., to the following 17 state, provincial, county, city and university laboratories in the United States

* Because of the excessive demands to which all laboratories were subjected following the outbreak of war, the labor involved in conducting this study and in compiling and reporting the results thereof, was divided between Dr. W. L. Mallmann, Chairman of the Standard Methods Committee on Water and Sewage, and the writer. It was arranged that the former should initiate the study, enlist laboratories to collaborate in the study and collect the results secured by them, whereupon these results were to be compiled and reported by the latter in his capacity of Referee for the committee. Accordingly, the original results from the collaborating laboratories were transmitted to the Referee early in the year, and from them was prepared the present report.

† Duponol products are manufactured by E. I. Du Pont de Nemours and Company, Wilmington, Dela.

and Canada, the directors of which agreed to collaborate in the study:

Laboratories

Connecticut State
 Maryland State
 Minnesota State
 Quebec Provincial
 West Virginia State
 Louisiana—Caddo Shreveport Health Unit
 Indiana—Indianapolis Water Co.
 Michigan—Detroit Filtration Plant
 Highland Park " "
 Escanaba " "
 Flint " "
 Saginaw " "
 Wyandotte " "
 Missouri—St. Louis Public Health
 California—Stanford University
 Pennsylvania—Pennsylvania State College
 University of Pennsylvania

Collaborators

Friend Lee Mickle
 C. A. Perry and A. A. Hajna
 H. A. Whittaker and D. M. Taylor
 Jacques Archambault
 Katherine E. Cox
 Alvin F. Meyer
 C. K. Calvert and E. R. Hupp
 W. M. Wallace; Fabien, and Rausch
 Irving Dahljelm
 S. J. Shank
 C. H. Burdick and W. V. Kennedy
 J. C. Richardson and A. C. Pendell, Jr.
 Harry W. Ward
 Jane I. Burns
 Paul Beard
 Michael A. Farrell
 David Lackman

The laboratory procedures specified for the comparative work included, briefly, planting of several portions (usually five 10 ml. and one 1.0 ml. portions) of sample in both lactose broth and lauryl sulfate tryptose broth; upon appearance of gas in these primary media, eosin-methylene-blue agar plates were streaked and colonies appearing on the plates were fished to both lactose broth and lauryl sulfate tryptose broth, and also to agar slants for microscopic examination. An additional transfer from gas positive tubes of one or both primary media to brilliant green bile (2 per cent) was also made by the majority of the collaborating laboratories, and the formation of gas in the bile, after incubation at 37° C. for 48 hours, was recorded.

It will be noticed that the procedures specified included two departures from the usual Standard Methods procedure: the substitution of lauryl sulfate tryptose broth for lactose broth as a primary medium, and also its substitution as a secondary medium in the "completed test."

AGGREGATE RESULTS

Since some of the collaborating labora-

tories made no transfers of primary gas positive tubes to brilliant green bile,

and some made such transfers only from lactose broth, the results will be reported under these headings: (A) with no transfer from primary gas positives; (B) with transfer from lactose broth primary gas positives; (C) with transfer from both lactose broth and lauryl sulfate tryptose broth gas positives. Consequently (B) will include (C), omitting from the latter the results of transfer to brilliant green bile from lauryl sulfate tryptose primary gas positives; and, likewise, (A) will include both (B) and (C), omitting from both of the latter the results of transfer to brilliant green bile.

Table 1 shows the aggregate results, reported by the various collaborating laboratories, from samples that yielded one or more primary gas positives. A large number of other samples were examined but, as they gave no gas positives when planted in the two primary media, are not included in the tabulations.

Table 1-A—A total of 17 laboratories reported the results shown in Table 1-A. It will be observed that, from 605 water samples yielding one or more primary gas positives, 1,873 of 3,415 portions of sample, or 54.8 per

TABLE 1

| Primary Medium | No. of Sample Portions Planted | Gas Positives Completely Confirmed Using Secondary | | | | | | | | Gas Positive upon Transfer of Primary to Brilliant Green Bile |
|--|---|---|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------|-----------------------------------|--|
| | | Portions Gas Positive | | Lactose Broth | | L.S.T. Broth | | | | |
| | | Per cent of Sample Portions | | Per cent of Sample Portions | | Per cent of Sample Portions | | | | |
| | | No. | Per cent of Sample Portions | No. | Per cent of Sample Portions | No. | Per cent of Sample Portions | No. | Per cent of Sample Portions | |
| A. Aggregate Results of Examination of 605 Water Samples Yielding Primary Gas Positives With No Transfer of Primary Positives to Brilliant Green Bile | | | | | | | | | | |
| Lactose broth | 3,415 | 1,873 | 54.8 | 1,117 | 32.7 | 1,142(1) | 33.4 | | | |
| L.S.T. broth | 3,415 | 1,628 | 47.7 | 1,222(3) | 35.8 | 1,261 | 36.9 | | | |
| B. Aggregate Results from 526 Water Samples Yielding Primary Gas Positives With Transfer of Lactose Broth Primary Positives to Brilliant Green Bile | | | | | | | | | | |
| Lactose broth | 2,996 | 1,687 | 56.3 | 1,025 | 34.2 | 1,052(1) | 35.1 | 1,088(2) | 36.3 | |
| L.S.T. broth | 2,996 | 1,486 | 49.6 | 1,115(3) | 37.2 | 1,150 | 38.4 | | | |
| C. Aggregate Results from 318 Water Samples Yielding Primary Gas Positives With Transfer of Lactose Broth and Lauryl Sulfate Tryptose Broth Primary Positives to Brilliant Green Bile | | | | | | | | | | |
| Lactose broth | 1,732 | 1,016 | 58.7 | 540 | 31.2 | 527(1) | 30.4 | 579(2) | 33.4 | |
| L.S.T. broth | 1,732 | 775 | 44.7 | 586(3) | 33.8 | 575 | 33.2 | 601(1) | 34.7 | |

Note: The figures in parentheses (which are included in the adjoining totals) represent the number of missing tubes, incomplete results, etc., which were considered positive in order to avoid loss of the remaining data obtained from these particular samples; a study of these data suggests that the error thus introduced is very probably negligible.

cent, planted in lactose broth, gave gas positives; whereas, 1,628 of a like number of sample portions, or 47.7 per cent, planted in L.S.T. (lauryl sulfate tryptose) broth yielded gas positives. When these primary positives were plated on eosin-methylene-blue agar and colonies fished to lactose broth and to L.S.T. broth, and to agar slant for microscopical examination, the 1,873 lactose broth primary positives yielded 1,117 complete confirmations of coliform organisms using secondary lactose broth, and 1,142 complete confirmations using lauryl sulfate tryptose broth. Consequently, the substitution of L.S.T. broth for lactose broth as a secondary medium yielded 25, or slightly over 2 per cent, more complete confirmations.

The use of lauryl sulfate tryptose broth as a primary medium reduced the number of primary gas positives from 1,873 to 1,628, or slightly over 13 per cent, but yielded 1,222 complete confirmations when using lactose broth as a secondary medium, and 1,261 when using L.S.T. broth as a secondary medium.

The number of complete confirmations of coliform organisms (1,117) obtained by the use of the usual procedure, employing L.B. (lactose broth), compares with the numbers secured by the use of L.S.T. broth at various stages of the procedure as follows:

| Primary | Secondary | No. | Per cent |
|---------|-----------|-------|----------|
| L.B. | — L.B. | 1,117 | 100.0 |
| L.B. | — L.S.T. | 1,142 | 102.2 |
| L.S.T. | — L.B. | 1,222 | 109.4 |
| L.S.T. | — L.S.T. | 1,261 | 112.9 |

Thus the use of L.S.T. broth, as primary and as secondary in the completed test, permitted an increase of 12.9 per cent in the number of complete confirmations compared with the usual procedure using lactose broth in these positions, despite a reduction of 13.1 per cent in the number of primary gas positives that had to be examined when using L.S.T. broth.

It is evident that this series of results indicates an increase in the number of sample portions containing coliforms detected through the use of L.S.T. broth, both as a primary and as

a secondary medium, which, although not very great, is nevertheless significant.

Lauryl sulfate tryptose broth was suggested as a primary medium principally because it gave promise of serving as a presumptive medium in which the formation of gas might be considered a practically sure indication of the presence of coliform organisms. In this respect, however, only 77.5 per cent of the L.S.T. primary gas positives yielded coliforms, even when using L.S.T. broth as a secondary medium, compared with 61.0 per cent of complete confirmations secured from lactose broth primary gas positives using the same secondary medium, and 59.6 per cent using lactose broth as the secondary medium. These relationships are shown below in tabular form:

| Pri- mary | Second- ary | Primary Gas Positives | Complete Confirmations | |
|---------------|----------------|-----------------------------|---------------------------|----------|
| | | | No. | Per cent |
| L.B. —L.B. | | 1,873 | 1,117 | 59.6 |
| L.B. —L.S.T. | | 1,873 | 1,142 | 61.0 |
| L.S.T.—L.B. | | 1,628 | 1,222 | 75.1 |
| L.S.T.—L.S.T. | | 1,628 | 1,261 | 77.5 |

It is interesting to compare these figures with those obtained in a previous study,³ reported in 1937, of the utility of fuchsin broth as a primary medium, with lactose broth the secondary medium, when a number of laboratories collaborated in the examination of 890 waters from various sources. Of 2,903 primary gas positives in fuchsin broth, 70.5 per cent were completely confirmed, whereas of 4,204 lactose broth primary positives, 50.2 per cent were completely confirmed. The number of complete confirmations from fuchsin broth primary gas positives was 97.06 per cent of that from lactose broth primary gas positives, whereas the present study indicates the number of complete confirmations, using L.S.T. broth as primary and secondary media, was 112.9 per cent of that from lactose

primary gas positives. Obviously, to judge from these figures, L.S.T. broth is the better medium of the two; but, as in the use of fuchsin broth, primary gas positives in L.S.T. broth must also be confirmed.

It has been suggested⁵ that the plating medium, eosin-methylene-blue agar employed in the Standard Methods procedure for the "completed test," inhibits the growth of some coliform organisms; and that, for this reason, gas in primary fermentation tubes constitutes evidence of the presence of coliform organisms more frequently than successful complete confirmation indicates. This contention is indeed probable, but the magnitude of the error thus introduced is problematical. A previous study² showed, by transfer from primary gas positives to various liquid media followed by complete confirmation of gas positives in the latter, that the error of the usual completed test performed on primary lactose broth positives averaged, at least, about 14 per cent, even when employing eosin-methylene-blue agar in the complete confirmation of the liquid confirmatory gas positives. If a practicable plating medium less inhibitive than E.M.B. agar can be found for use in the "completed test," the present procedure of complete confirmation may have to be debited with an additional error; but until the magnitude of the error due to the use of E.M.B. agar is definitively determined, there appears to be no alternative to acceptance of this plating medium in the "completed test."

Finally, the aggregate results shown in Table 1-A indicate that L.S.T. broth could not be employed as a presumptive test of the samples examined without confirmation, but that its use both as primary and secondary medium in the "completed test" permitted about 13 per cent more complete confirmations than did the use of lactose broth, with a reduction of about 13 per cent in the

number of primary gas positives that had to be confirmed.

Table 1-B—Fifteen laboratories included a transfer from primary lactose broth gas positives to brilliant green bile in their examination of 526 water samples. It will be observed that the relationships between the "completed test" results, shown in Table 1-B, secured from the use of lactose broth and lauryl sulfate tryptose broth in the examination of these samples, resemble fairly closely those described in the discussion of the results of Table 1-A.

Use of the "confirmatory test," employing transfer to brilliant green bile from lactose broth primary gas positives and considering formation of gas in the bile to constitute evidence of the presence of coliform organisms, indicated 36.3 per cent of the sample portions planted to contain these organisms. This proportion is slightly higher than the 34.2 per cent of complete confirmations secured by the usual Standard Methods procedure, and the 35.1 per cent by the same procedure using L.S.T. broth instead of lactose broth as the secondary medium. It is slightly lower, however, than the proportion of 37.2 per cent obtained from the use of L.S.T. broth as the primary medium, and that of 38.4 per cent secured by employing L.S.T. broth both as primary and secondary media.

Table 1-C—Eleven laboratories included transfers from both lactose broth and L.S.T. broth primary gas positives to brilliant green bile in their examination of 318 water samples.

The results of this series, given in Table 1-C, show that the proportions of water sample portions in which the presence of coliform organisms was indicated by these two "confirmatory" procedures compared with the complete confirmation procedures as shown above, right.

Evidently the indications of the presence of coliform organisms furnished by

| <i>P.i.</i> | <i>Second-</i> | <i>Gas</i> | <i>Per cent of</i> |
|-------------|----------------|---------------|---------------------|
| <i>mary</i> | <i>dary</i> | <i>in</i> | <i>Water Sample</i> |
| | | <i>B.G.B.</i> | <i>Portions</i> |
| | | | <i>Positive</i> |
| L.B. | —L.B. | | 31.2 |
| L.B. | —L.S.T. | | 30.4 |
| L.S.T. | —L.B. | | 33.8 |
| L.S.T. | —L.S.T. | | 33.2 |
| L.B. | | + | 33.4 |
| L.S.T. | | + | 34.7 |

gas formation in brilliant green bile, following transfer from either lactose broth or L.S.T. broth primary gas positives, were slightly less numerous (33.4 per cent) and slightly more numerous (34.7 per cent), respectively, than those (33.8 per cent) furnished by the complete confirmation of L.S.T. primary positives using lactose broth secondary, which in this series of examinations yielded the best of the "completed test" results.

It may be concluded, therefore, from the aggregate results of Table 1, that L.S.T. broth could not be employed in a presumptive test, without confirmation, of these waters; that the substitution of L.S.T. broth both as primary and secondary media yielded somewhat more frequent complete confirmation of the presence of coliform organisms than the other complete confirmation procedures, and about the same number of indications of the presence of coliforms as that from the use of lactose broth primary followed by the brilliant green bile confirmatory test (gas only); and that the use of L.S.T. primary followed by the brilliant green bile confirmatory test furnished, by a small margin, the greatest number of indications of the presence of coliforms.

RESULTS FROM DIFFERENT TYPES OF WATERS

The data summarized in Table 1 are distributed in Table 2 according to type of water examined: Under each type heading are given three sets of figures corresponding to the A, B, and C

groups of Table 1, the first set showing the results secured when no transfer of primary gas positive to brilliant green bile was made, the second set when such transfer was made from lactose broth primary gas positives, the third set when such transfer was made from both primary media gas positives. The

first set of figures includes the second and third, and the second set includes the third, as in Table 1.

It will be observed in Table 2 that the results secured from the various types of waters present as a rule the same general picture as that furnished by the aggregate results. The L.S.T.

TABLE 2
Results of Examination of Different Types of Waters

| Raw | Primary Medium | No. of Sample Portions Planted | Portions Gas Positive Per cent | Complete Confirmations Using Secondary | | Gas in B.G. Bile upon Transfer from Primary Per cent |
|--|----------------|--------------------------------|--------------------------------|--|-----------------|--|
| | | | | L.B. Per cent | L.S.T. Per cent | |
| 12 laboratories | L.B. | 750 | 66.9 | 46.5 | 45.7 | .... |
| 139 samples | L.S.T. | 750 | 64.1 | 48.8 | 48.8 | .... |
| 12 laboratories | L.B. | 695 | 67.2 | 46.8 | 45.8 | 46.8 |
| 128 samples | L.S.T. | 695 | 64.0 | 48.1 | 48.1 | .... |
| 9 laboratories | L.B. | 515 | 71.3 | 47.2 | 45.6 | 48.4 |
| 98 samples | L.S.T. | 515 | 65.2 | 48.2 | 46.8 | 47.6 |
| <i>Unfinished</i> | | | | | | |
| 10 laboratories | L.B. | 535 | 50.7 | 15.3 | 15.3 | .... |
| 99 samples | L.S.T. | 535 | 21.1 | 15.9 | 16.3 | .... |
| 10 laboratories | L.B. | 517 | 50.1 | 15.5 | 15.5 | 17.4 |
| 95 samples | L.S.T. | 517 | 21.7 | 16.2 | 16.6 | .... |
| 8 laboratories | L.B. | 481 | 53.4 | 16.6 | 16.6 | 18.7 |
| 92 samples | L.S.T. | 481 | 21.8 | 17.5 | 17.7 | 18.9 |
| <i>Finished</i> | | | | | | |
| 9 laboratories | L.B. | 434 | 37.6 | 10.8 | 11.1 | .... |
| 77 samples | L.S.T. | 434 | 16.1 | 11.8 | 11.5 | .... |
| 8 laboratories | L.B. | 410 | 39.3 | 11.5 | 11.7 | 12.0 |
| 73 samples | L.S.T. | 410 | 16.3 | 11.7 | 11.5 | .... |
| 6 laboratories | L.B. | 332 | 41.3 | 10.2 | 10.8 | 11.1 |
| 60 samples | L.S.T. | 332 | 16.9 | 12.3 | 11.4 | 13.9 |
| <i>Pools</i> | | | | | | |
| 5 laboratories | L.B. | 310 | 35.8 | 17.7 | 16.8 | .... |
| 58 samples | L.S.T. | 310 | 24.5 | 19.4 | 20.0 | .... |
| 3 laboratories | L.B. | 90 | 38.9 | 31.9 | 31.9 | 30.0 |
| 15 samples | L.S.T. | 90 | 37.8 | 34.4 | 34.4 | .... |
| 3 laboratories | L.B. | 78 | 43.6 | 34.6 | 34.6 | 33.3 |
| 13 samples | L.S.T. | 78 | 41.0 | 38.5 | 38.5 | 38.5 |
| <i>Wells Springs</i> | | | | | | |
| 7 laboratories | L.B. | 1,195 | 61.0 | 44.5 | 45.8 | .... |
| 200 samples | L.S.T. | 1,195 | 66.0 | 50.7 | 52.3 | .... |
| 6 laboratories | L.B. | 1,099 | 60.9 | 44.9 | 46.2 | 48.0 |
| 184 samples | L.S.T. | 1,099 | 66.3 | 51.3 | 52.9 | .... |
| 3 laboratories | L.B. | 308 | 69.1 | 48.7 | 46.8 | 55.8 |
| 52 samples | L.S.T. | 308 | 76.6 | 56.8 | 56.2 | 58.8 |
| <i>Miscellaneous (type not reported)</i> | | | | | | |
| 6 laboratories | L.B. | 191 | 50.8 | 27.2 | 36.6 | .... |
| 32 samples | L.S.T. | 191 | 51.8 | 28.5 | 37.2 | .... |
| 5 laboratories | L.B. | 185 | 51.9 | 28.1 | 37.8 | 37.8 |
| 31 samples | L.S.T. | 185 | 53.5 | 29.2 | 38.4 | .... |
| 2 laboratories | L.B. | 18 | 44.4 | 33.3 | 27.8 | 27.8 |
| 3 samples | L.S.T. | 18 | 55.6 | 44.4 | 44.4 | 44.4 |
| <i>Sea Water</i> | | | | | | |
| 1 laboratory | L.B. | 40 | 45.0 | 40.0 | 42.5 | 45.0 |
| 10 samples | L.S.T. | 40 | 55.0 | 50.0 | 50.0 | .... |

broth primary gas positives were usually less numerous than the lactose broth gas positives, 56 to 58 per cent less numerous in the case of unfinished and finished waters, although slightly more numerous in the case of well and spring, miscellaneous, and sea waters.

The proportion of L.S.T. primary gas positives that were shown by the "completed test" (using L.S.T. broth as secondary medium) to contain coliform organisms, varied from about 70 per cent for finished waters to 82 per cent for swimming pool waters, the percentage usually ranging between 75 and 80. Evidently the formation of gas in primary L.S.T. broth could not be considered very sure proof of the presence of coliform organisms.

As a rule there was very little difference between the results of employing lactose broth and L.S.T. broth as secondary media in the "completed test."

The use of L.S.T. broth as both primary and secondary media in the "completed test," however, permitted isolations of coliforms from more sample portions than did the use of lactose broth, as indicated below:

| <i>Type of Water</i> | <i>Per cent of Positive Completed Tests Using Usual Standard Method (Lactose Broth)</i> |
|----------------------|---|
| Raw | 105 |
| Unfinished | 106 |
| Finished | 106 |
| Swimming pools | 113 |
| Wells and springs | 117 |
| Sea water | 125 |
| Miscellaneous | 137 |

These figures do not indicate much advantage, as regards positive complete confirmation, in substitution of L.S.T. broth for lactose broth in the examination of waters from purification plants, but it must be remembered that fewer primary positives had to be confirmed when L.S.T. broth was employed. In the examination of swimming pools,

wells and springs, and other waters, however, this substitution increased the number of positive complete confirmations by 13 to 37 per cent.

The "confirmatory tests," employing transfer from primary gas positives to brilliant green bile, indicated as a rule about the same frequency of presence of coliform organisms as did the best of the "completed tests," with one exception: four (Minnesota, Pennsylvania State College, Quebec, West Virginia) of the six laboratories performing "confirmatory tests" of well and spring waters reported a total of positive "completed tests," using L.S.T. broth primary and secondary, which was about 16 per cent greater than that of "confirmatory tests" with brilliant green bile following lactose broth primary. An interesting feature of the reports from these four laboratories on ground waters was the greater number of primary gas positives in L.S.T. broth (554) compared with that in lactose broth (509). Generally, however, the greatest number of positive indications of the presence of coliforms was secured by the use of L.S.T. broth primary followed by "confirmatory" brilliant green bile, taking formation of gas in the latter to constitute a positive result.

Consequently, the results from the various types of water samples examined confirm in general the conclusions derived from the aggregate results. Furthermore, the separate groups of results reported by the various collaborating laboratories, with few exceptions, also confirm these conclusions.

FINISHED WATERS

Since the use of L.S.T. broth appears to reduce the number of primary gas positives that must be confirmed, particular interest attends its employment in the examination of finished waters, which usually yield an excessive proportion of false lactose broth primary gas positives. Consequently Table 3

TABLE 3
Results of Examination of Finished Waters

| Laboratory | Primary Medium | Sample Portions Planted | Primary Gas Positives | Complete Confirmations Using Secondary | | Gas in B.G. Bile upon Transfer from Primary |
|--------------------|----------------|-------------------------|-----------------------|--|--------|---|
| | | | | L.B. | L.S.T. | |
| Indianapolis, Ind. | L.B. | 97 | 56 | 0 | 0 | 0 |
| | L.S.T. | 97 | 0 | 0 | 0 | 0 |
| Maryland | L.B. | 42 | 16 | 6 | 6 | 6 |
| | L.S.T. | 42 | 13 | 13 | 11 | 13 |
| Penn. State Coll. | L.B. | 24 | 12 | 3 | 4 | 5 |
| | L.S.T. | 24 | 10 | 6 | 5 | 8 |
| Penn. University | L.B. | 103 | 41 | 25 | 26 | 26 |
| | L.S.T. | 103 | 32 | 22 | 22 | 25 |
| Saginaw | L.B. | 30 | 6 | 0 | 0 | 0 |
| | L.S.T. | 30 | 0 | 0 | 0 | 0 |
| Wyandotte, Mich. | L.B. | 36 | 6 | 0 | 0 | 0 |
| | L.S.T. | 36 | 1 | 0 | 0 | 0 |
| Minnesota | L.B. | 42 | 12 | 8 | 8 | 8 |
| | L.S.T. | 42 | 8 | 5 | 7 | .. |
| Quebec | L.B. | 30 | 11 | 5 | 4 | 4 |
| | L.S.T. | 30 | 2 | 1 | 1 | .. |
| Louisiana | L.B. | 12 | 1 | 0 | 0 | .. |
| | L.S.T. | 12 | 3 | 3 | 3 | .. |

is presented, showing the results reported by those laboratories that examined at least a few finished water samples.

Of the six laboratories, listed in Table 3, that reported coliforms in finished waters, three isolated more by the use of the usual Standard Method procedure using lactose broth than by the use of L.S.T. broth primary, whereas the experience of the other three laboratories was the reverse.

These data are too few in number to permit a conclusion regarding the applicability of lauryl sulfate tryptose broth to the examination of finished waters. Much more information is needed to establish whether the medium inhibits coliform organisms that have been subjected to purification processes.

CONCLUSIONS

Seventeen laboratories situated in the United States and Canada have collaborated in a study of the utility of lauryl sulfate tryptose broth for detection of the presence of coliform organisms in water. A total of 605 water samples from which primary gas positives were obtained, was examined, em-

ploying L.S.T. broth as a primary and as a secondary medium for comparison with lactose broth in the Standard Methods "completed test" procedure. Of these samples, 526 were also subjected to the "confirmed test" procedure employing transfer from lactose broth primary gas positives to brilliant green bile; and 318 were examined further by transfer from L.S.T. broth primary gas positives to brilliant green bile.

The results reported by the collaborating laboratories indicated that, in general:

1. A reduction of about 13 per cent in the number of sample portions producing gas in the primary medium resulted when L.S.T. broth was substituted for lactose broth, this reduction being particularly evident in the results from unfinished, finished and swimming pool waters.

2. As coliform organisms were isolated from only 75.1 per cent of L.S.T. broth primary gas positives when using lactose broth secondary, and from 77.5 per cent when using L.S.T. broth secondary in the usual Standard Methods "completed test" procedure, it is evident that L.S.T. broth could not be employed as a presumptive medium, without confirmation, in the examination of these waters.

3. Since the use of L.S.T. broth as both primary and secondary media permitted iso-

lation of coliform organisms from 1,261 sample portions, about 13 per cent more than the 1,171 portions from which isolations were secured when lactose broth was employed, the substitution of the former medium for the latter appeared to be advantageous; but the paucity of data reported on finished waters precludes a definitive conclusion at this time regarding the utility of L.S.T. broth in the examination of this important group of waters.

4. The use of the "confirmed test" (transfer of primary gas positive to brilliant green bile, taking gas in the latter to indicate the presence of coliform organisms) yielded about as many positive results as did any of the "completed tests," whether transfer was made from the lactose broth or the L.S.T. broth primary gas positives. Transfer from the L.S.T. broth, however, resulted in a small increase (3.8 per cent) in the number of positive "confirmed tests" compared with transfer from lactose broth gas positives.

On the whole, the substitution of lauryl sulfate tryptose broth for lactose broth in the Standard Methods procedures promises a reduction in the number of primary gas positives to be

confirmed and an increase in the number of positive indications of the presence of coliform organisms. Consequently further study of the medium by interested laboratories is recommended, particularly with reference to its utility in the examination of finished waters.

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Poliomyelitis in Cuyahoga County, Ohio, 1941*

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WITHIN recent years Cuyahoga County has experienced frequent outbreaks of anterior poliomyelitis. During the period 1925-1940, the median number of resident cases reported annually was 40, and no year was free from the disease. In the lowest year, 1938, only 5 cases were reported and in the highest, 1930, the total reached 170. If incidence higher than the median be taken as the criterion, there have been 8 epidemics within this period.

In 1941 the county suffered its largest epidemic, with 189 reported cases. Of these, 134 were residents of Cleveland and 55 of the remainder of the county which includes 13 smaller cities, 40 villages, and 6 townships. The annual attack rate per 100,000 population was 15.5 for the entire county, 15.3 for Cleveland, and 16.2 for the rest of the county. Provisional figures indicate that incidence for the county was approximately twice as high as that for Ohio (7.0) and for the whole United States (6.8). The local character of the epidemic is evident from the fact that the number of cases reported in Ohio was slightly lower in 1941 than

in 1940. In 1940 the disease was most prevalent in the North Central and Northwestern States; in 1941, in the East South Central and South Atlantic States.¹

The present study is an analysis of records collected at the time of this epidemic and on reëxamination of survivors from 4 to 6 months after attack.

I. DATA COLLECTED DURING EPIDEMIC

A central county register for poliomyelitis was established in July, 1941, and current epidemiological records were obtained by public health nurses. Fortunately, 179, or 95 per cent, of the cases were hospitalized. Of these, 174 were admitted to the Contagious Division of the Cleveland City Hospital and 5 to other hospitals in the area. It was thus possible to verify the diagnosis, check the accuracy of many of the entries on the nurses' schedules, and supplement the health department records.

CLINICAL FINDINGS

Type of disease—The clinical classification of all cases reported during the year is presented in Table 1. A striking feature of poliomyelitis is that the relative frequency of various clinical types may differ considerably from epidemic to epidemic. The high propor-

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tion of bulbospinal and bulbar cases (31.2 per cent) indicates the severity of the epidemic. Only 17.5 per cent were abortive. This is in sharp contrast to the epidemics of 1931 and 1937 in Cuyahoga County, in which 50 per cent and 40 per cent, respectively, of the cases were abortive.²

TABLE 1

Clinical Classification of Cases of Poliomyelitis, Cuyahoga County, 1941

| Type | Number | Per cent |
|-------------------|--------|----------|
| Paralytic (total) | 156 | 82.5 |
| Spinal | 97 | 51.3 |
| Bulbospinal | 30 | 15.9 |
| Bulbar | 29 | 15.3 |
| Abortive | 33 | 17.5 |
| All types | 189 | 100.0 |

Early signs and symptoms—Fever was the most frequent prodromal symptom, occurring in 70 per cent of both paralytic and abortive cases. Muscle pain, headache, stiff neck or back, vomiting, nausea, and fatigue were the next most frequent in order of occurrence.

The interval elapsing between onset of the disease and appearance of paralysis or muscular weakness was ascertained for 133 of 156 cases. Paralysis appeared most frequently on the third day. By the end of the first week paralysis was noted in 80 per cent of those in whom it was ultimately detected. Probably some of the longer intervals are attributable to error in date of onset or to failure to detect muscular weakness promptly.

Spinal fluid—Results of spinal fluid examinations were available for 174 of the cases. Only 5 individuals (3 per cent) had counts of less than 10 cells per cu. mm. and 12 (7 per cent) had counts of 300 or over. The median cell count was 83. There was little difference between cell counts of paralytic and abortive cases.

Differential spinal fluid cell counts were available for 171 cases. Only 10 cases (6 per cent) had counts in which

more than 50 per cent of cells were polymorphonuclear. In 109 (64 per cent) the mononuclear leukocytes predominated and in 52 (30 per cent) only mononuclear cells were present. Here again there was little difference as between the various types of the disease.

EPIDEMIOLOGY

Chronology—Prior to July, 4 cases had been reported, 2 in January and 2 in April. During the first week of July, 1 case occurred in the city of East Cleveland and another in the village of University Heights about three miles away. No connection was established between these cases. Thereafter the increase was rapid and the epidemic reached its peak during the first week of August.

Characteristically, the rise of the epidemic curve was steeper than its fall. One-quarter of the cases had onset prior to August 3, one-half prior to August 17, and three quarters prior to September 6. That is, the second quarter of the epidemic required only 14 days for development, from August 3 to August 17, while the third quarter required 20 days, from August 17 to September 6. All but 2 cases had their onset before October 16.

Geographical distribution—Cases occurred in practically all parts of the county but the distribution was not uniform. In the northeastern section, where the epidemic ran an earlier course, the attack rate was 24.6 per 100,000 as compared to 12.6 for the remainder of the county. At the outset some factor peculiar to the section, such as contaminated milk supply or other food, was suspected. No evidence of this was obtained as is discussed later.

Age—Acute anterior poliomyelitis is commonly referred to as infantile paralysis. Recent trends in age distribution of individuals attacked, however, together with frequent occurrence of the abortive or non-paralytic type of the

disease, have made the term misleading. Smaller proportions of cases appear to be occurring in the very young. Thus in the New York City epidemic of 1916, 79 per cent of cases were under 5 years of age while in that of 1935 in the same city only 34 per cent of reported cases were in children of this age group.

In Cuyahoga County a similar change has taken place. This is shown in Table 2 where the age distributions of cases in 5 outbreaks of poliomyelitis, in which more than 50 cases were reported, are presented. The contrast between the ages of cases in 1941 and in 1930 is especially striking. The percentage of cases under 5 years of age in 1941 was slightly more than one-third that observed in 1930, but the percentage of cases 15 years and over was almost 6 times greater. As a result the median age of cases in 1941 (10.1 years) was 5 years higher than in 1930.

this epidemic the excess was somewhat higher, 115, or 61 per cent of the cases, occurring in males. The attack rate for males was 18.8 per 100,000 and for females, 12.2.

Study of the percentage distribution of clinical types of disease by sex revealed no significant difference. This is in direct contrast to the findings of Davis, Weber, and Arey⁴ in an epidemic of 196 cases in Charleston County, S. C., in 1940, in which the spinal type of the disease was found to be significantly more frequent in females than in males, while the reverse was true for the bulbar and bulbospinal types.

Males were attacked at somewhat earlier ages, their median age being 9.2 years as compared to 11.5 years for females.

Race—In the present epidemic 9 of the individuals reported were Negroes. The attack rate for the Negro popula-

TABLE 2

Percentage Age Distribution of Cases of Poliomyelitis in Epidemics of 1930, 1933, 1934, 1937, and 1941, Cuyahoga County

| Age (Years) | Year | | | | |
|----------------|---------------------|--------------------|--------------------|--------------------|---------------------|
| | 1930 (170 Cases) | 1933 (63 Cases) | 1934 (51 Cases) | 1937 (70 Cases) | 1941 (189 cases) |
| Under 5 | 51.2 | 28.6 | 31.4 | 41.4 | 19.0 |
| 5-9 | 34.1 | 41.3 | 33.3 | 22.9 | 30.2 |
| 10-14 | 10.6 | 27.0 | 17.6 | 27.1 | 27.5 |
| 15-19 | 1.2 | 3.1 | 9.8 | 5.7 | 12.7 |
| 20 and over | 2.9 | .... | 7.9 | 2.9 | 10.6 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Median (years) | 4.9 | 7.6 | 7.8 | 6.9 | 10.1 |

Despite these changes in age selectivity of the disease, poliomyelitis still attacks individuals under 15 years of age far out of proportion to their representation in the population. *Seventy-seven per cent* of all cases reported in 1941 were in persons of these ages who constitute only *20 per cent* of the population of the county.

Sex—A finding common to most outbreaks of poliomyelitis is that males are attacked more frequently than females. The usual percentages are about 55 per cent and 45 per cent, respectively.³ In

tion was 11.6 per 100,000 and that for the white 15.8. Of cases among Negroes, 5 were abortive, 2 spinal, 1 bulbospinal, and 1 bulbar.

Multiple cases—The 189 cases of poliomyelitis occurred in 180 different families. There were 2 families with 3 confirmed cases each, and 5 with 2. Nine of these cases were of the spinal type, 3 bulbar, 1 bulbospinal, and 3 abortive. Not all of the 9 subsequent cases can be classified as secondary since, in the 2 households with 3 cases each, 2 cases occurred on the same day, and in 2 other

households the interval was only one day. Since the incubation period of the disease is usually considered to fall within the limits of 5 to 20 days after exposure it is more probable that in these families the cases were simultaneously infected than that one infected the other. In the remaining households the later case may have contracted the disease from the earlier, since the intervals between onsets were, respectively, 5, 10, 11, 12, and 15 days. Of these secondary cases 3 were spinal in type, 1 was bulbar, and 1 abortive.

The household schedules were incomplete as regards number and ages of household associates of the 184 primary cases. The estimated number of associates is 438. Among these there occurred 5 cases at the intervals given above, an attack rate of 1.1 per cent, far in excess of that for the entire year for the general population (15.5 per 100,000 or 0.015 per cent).

In addition to these 5 secondary cases only 1 had a history of probable contact. Two cases occurred in the same apartment house within 14 days of each other. Thus, in common with other urban epidemics of poliomyelitis, this outbreak was characterized in general by a lack of obvious association between frank cases of the disease.

Water supply—Only 3 cases occurred outside the area of the Cleveland distribution system. There is no direct evidence, therefore, either for or against the transmission of the virus by drinking water in this epidemic.

Milk supplies—The source of milk used within 3 weeks prior to onset was given for 145 cases. Of these 1 had used canned milk only. For another, the source was the family cow. The remaining individuals obtained milk from 39 of the 135 authorized dairies of the county. There was not a disproportionately large number of cases among the customers of any of these.

Uncooked fruits and vegetables—Facts

regarding the consumption of uncooked fruits and vegetables were available for 172 cases. Of these only 5 had not used raw fruits and vegetables within 3 weeks prior to onset of disease. The names of the stores at which these articles were purchased were not obtained and it is impossible to tell whether there was a disproportionate number of cases among the customers of any grocer. Because of the wide geographic distribution of the cases this appears unlikely.

Thus, from the foregoing, together with other characteristics of the epidemic, it appears unlikely that the virus was spread by the agency of any fruit, vegetable, milk, or water supply.

Swimming—A precautionary measure taken by health officials during the epidemic was the closing of several swimming pools and beaches within the county. A history of swimming within 3 weeks before onset of symptoms was given by 48 individuals and a history of no swimming by 107. On 34 records no information was given. The proportion of swimmers, for persons of the ages attacked, does not seem to have special significance but the swimming status of the general population is unknown.

Attack rates by economic areas of the county—Information as to economic status of inhabitants of various census tracts of Cuyahoga County was obtained in 1940 by the Real Property Inventory and was made available by Howard Whipple Green. For statistical purposes the county has been divided into economic tenths according to the average rentals of rented houses and equivalent rentals of owned homes in census tracts. Each of these tenths includes approximately 29,000 families, one-tenth of the total families of the county. It was possible, therefore, to distribute the cases of poliomyelitis by economic tenths and to compute the corresponding attack rates.

These rates are presented in Table 3.

With the exception of Economic Tenth 5, which had the highest attack rate, the inhabitants of Economic Tenth 7, 8, 9, and 10 experienced rates consistently higher than the remainder of the county. That is, individuals living in areas of more expensive rentals were attacked by the disease somewhat more frequently than those living in other areas.

lected regarding the possible incrimination of flies as a vector of the virus. All the facts which have been collected, including the rather gradual development of the epidemic, the earlier peak in the northeastern section of the county, and the failure to incriminate any water, milk, or food supply, are consistent with the opinion that the disease was spread chiefly by human carriers and that the

TABLE 3
Attack Rates per 100,000 Population by Economic Tenth; Poliomyelitis, Cuyahoga County, 1941

| <i>Economic Tenth</i> | <i>Average Rentals of Rented Homes and Equivalent Rentals of Owned Homes in Census Tract</i> | <i>Cases</i> | <i>Population</i> | <i>Attack Rate</i> |
|-----------------------|--|--------------|-------------------|--------------------|
| 1 | \$7.15-\$19.42 | 14 | 110,258 | 12.7 |
| 2 | 19.51- 22.75 | 9 | 113,452 | 7.9 |
| 3 | 22.90- 25.48 | 16 | 120,925 | 13.2 |
| 4 | 25.52- 28.34 | 14 | 121,449 | 11.5 |
| 5 | 28.47- 31.78 | 37 | 128,564 | 28.8 |
| 6 | 31.80- 33.52 | 13 | 119,437 | 10.9 |
| 7 | 33.60- 35.42 | 22 | 118,538 | 18.6 |
| 8 | 35.49- 41.59 | 23 | 136,147 | 16.9 |
| 9 | 42.91- 53.04 | 21 | 122,800 | 17.1 |
| 10 | 54.20-170.54 | 20 | 125,680 | 15.9 |
| Total | | 189 | 1,217,250 | 15.5 |

This fact is emphasized since the discovery of the virus of poliomyelitis in excreta and in sewage points to the possibility of infection by the gastrointestinal route. Also the isolation of the virus from flies in Cleveland and elsewhere⁵ during the summer of 1941 gave widespread popularity to the idea that the present epidemic was spread by these insects. It would seem that if excreta are a major factor either directly or through the agency of flies, inhabitants of lower economic areas would have experienced higher attack rates. It should be added that no directly pertinent epidemiological data were col-

effective vehicle was discharges from the upper respiratory tract.

Case fatality—There were 16 deaths recorded among the 189 cases, a fatality rate of 8.5 per cent. This was lower than the average case fatality for poliomyelitis in Cuyahoga County during the periods 1925-1930 (11.5) and 1931-1935 (14.2), but slightly higher than that for the period 1936-1940 (6.6).

The fatality rate varied markedly according to sex and age (Table 4). The rate for males (11.3) was nearly 3 times that for females (4.1). The risk of death was greatest for males of 10 years

TABLE 4
Case Fatality Rates (Per cent) by Age and Sex; Poliomyelitis, Cuyahoga County, 1941

| <i>Age (Years)</i> | <i>Males</i> | | | <i>Females</i> | | | <i>Total</i> | | |
|--------------------|--------------|---------------|-------------|----------------|---------------|-------------|--------------|---------------|-------------|
| | <i>Cases</i> | <i>Deaths</i> | <i>Rate</i> | <i>Cases</i> | <i>Deaths</i> | <i>Rate</i> | <i>Cases</i> | <i>Deaths</i> | <i>Rate</i> |
| Under 10 | 64 | 4 | 6.3 | 29 | 2 | 6.9 | 93 | 6 | 6.5 |
| 10-19 | 39 | 6 | 15.4 | 37 | 1 | 2.7 | 76 | 7 | 9.2 |
| 20 and over | 12 | 3 | 25.0 | 8 | .. | ... | 20 | 3 | 15.0 |
| Total | 115 | 13 | 11.3 | 74 | 3 | 4.1 | 189 | 16 | 8.5 |

TABLE 5

Case Fatality Rates (Per cent) by Sex and Clinical Type of Disease; Poliomyelitis, Cuyahoga County, 1941

| Type | Males | | | Females | | | Total | | |
|-------------|-------|--------|------|---------|--------|------|-------|--------|------|
| | Cases | Deaths | Rate | Cases | Deaths | Rate | Cases | Deaths | Rate |
| Spinal | 58 | .. | .... | 39 | .. | .... | 97 | .. | .... |
| Bulbospinal | 21 | 6 | 28.6 | 9 | 1 | 11.1 | 30 | 7 | 23.3 |
| Bulbar | 17 | 7 | 41.2 | 12 | 2 | 16.7 | 29 | 9 | 31.0 |
| Abortive | 19 | .. | .... | 14 | .. | .... | 33 | .. | .... |
| Total | 115 | 13 | 11.3 | 74 | 3 | 4.1 | 189 | 16 | 8.5 |

of age and over and least for females of the same ages.

Deaths occurred among the bulbospinal and bulbar cases only (Table 5). For the bulbar type approximately 1 of every 3 attacked died and for the bulbospinal 1 of every 4. Although the fatality rate for each type was higher for males than for females, the number of cases was too small to make the difference significant.

The fatality rate for cases with onset before the median date was higher than for those of the second half of the epidemic. This is attributable entirely to a marked change in fatality rate in the bulbar type. Of the 13 bulbar cases with onset before the median date 7 died while of the 16 with onset after that date only 2 died.

II. REEXAMINATION OF SURVIVORS, FEBRUARY-MARCH, 1942

In February, 1942, approximately 6 months after the peak of the epidemic, arrangements were made for muscle examinations of the survivors. The purpose was to assess the type and extent

of disabilities and to inform the attending physician of the findings. Each of the survivors who reported at the clinic was given a uniform examination to determine the degree of residual paralysis in the muscles of the legs, arms, abdomen, back, neck, face, speech, and deglutition. The results were recorded on standard muscle examination charts.

From the completed charts it was possible to classify the survivors into one or another of the following groups:

Group I—Individuals in whom no weakness or paralysis in any group of muscles was discovered.

Group. II—Individuals whose gait was normal and who appeared to have unimpaired use of all extremities. Careful examination, however, revealed slight weakness in one or more groups of muscles.

Group III—Individuals with severe paralysis of one extremity and/or moderate paralysis of other extremities. These impairments were such that with the aid of braces, crutches, or other supports the patient was able to get around relatively well.

Group IV—Individuals with severe paralysis of two or more extremities. These involvements were such that the patient was not (or would not be) bedridden but, even

TABLE 6

Distribution of Survivors Reexamined According to Original Diagnosis; Poliomyelitis, Cuyahoga County, 1941

| Original Diagnosis | Total | Reexamined | Per cent of Each Type Reexamined | Per cent Distribution | |
|-----------------------|-------|------------|--|-----------------------|------------|
| | | | | Total | Reexamined |
| Spinal | 97 | 84 | 86.6 | 56.1 | 61.3 |
| Bulbospinal | 23 | 15 | 65.2 | 13.3 | 11.0 |
| Bulbar | 20 | 17 | 85.0 | 11.5 | 12.4 |
| Abortive | 33 | 21 | 63.6 | 19.1 | 15.3 |
| Total | 173 | 137 | 79.2 | 100.0 | 100.0 |

with the use of the proper supports, had (or would have) only limited activity.

Group V—Individuals with such severe paralysis of their extremities that they were bedridden.

Examinations were completed on 137, or 79 per cent, of the 173 survivors. The distribution of survivors according to original diagnosis and number of each type examined is shown in Table 6.

Sufficiently large proportions of individuals who had each type of disease were reexamined so that the findings should be fairly representative of the condition of all survivors. If anything, the results should show a smaller proportion of individuals with minimal or no weakness than if all had been examined; for, from telephone conversations with the survivors who were not examined or with some member of their family, it was determined that none was bedridden and that all were up and about. The excuses for not coming in for examination were that the parents did not want to take the child from school; or they did not think the child needed an examination; or, in the case of several adults, that they did not wish to take time off from work.

Two other individuals, one a previous spinal case and the other an abortive, had died from causes other than poliomyelitis since their discharge from the hospital. The causes of death, as given on the death certificates, were a retroperitoneal sarcoma for the former and a fractured skull for the latter.

Results of examinations—The following is the classification of the 137 re-examined survivors according to extent of paralysis:

| | | Number | Per cent |
|-----------|------------------------------------|--------|----------|
| Group I | normal | 7 | 5.1 |
| Group II | minimal paralysis | 77 | 56.2 |
| Group III | moderate paralysis | 38 | 27.7 |
| Group IV | severe paralysis; not bedridden | 10 | 7.3 |
| Group V | severe paralysis; bedridden | 5 | 3.7 |
| Total | | 137 | 100.0 |

Thus, 5 per cent of the survivors examined were normal and an additional 56 per cent had practically full use of all extremities and could walk normally and unaided. It was considered that with occasional visits to an orthopedist the slight defects found in the latter group could probably be corrected.

The physical impairments of many of those in Group III could likewise be overcome to a large extent by proper treatment. In 15 of these, in whom the damage was limited to a lower extremity, no artificial aid was needed although all walked with a limp. Another who had minimal paralysis of all extremities walked unaided. In 4 the paralysis was limited to one arm, and 1 of these wore a support; 1 wore a corset for support of paralyzed abdominal muscles, and 2 who were still receiving hospital treatment will walk with the aid of crutches or braces when discharged. The remainder walked with the aid of the following: 7 with braces on one leg, 3 with crutches, 3 with braces and crutches, 1 with a cane, and 1 with shoe correction.

The individuals in groups IV and V (11 per cent) were the more seriously affected survivors of the epidemic. They will probably always be seriously impaired or bedridden.

Condition by original diagnosis—In Table 7 the condition of the survivors at reexamination is related to their original diagnosis.

Although the bulbospinal and bulbar types caused high fatality rates the survivors made good recoveries. Of 15 who survived the bulbospinal type only 1 was bedridden (Group V), 4 were classified in Group III, and 10 had recovered with only minimal weakness (Group II). Among those of Groups II and III there are included 3 who had impairment of muscles of face and deglutition, 1 of muscles of face, speech, and deglutition, 1 of muscles of face and speech, and 1 of facial muscles only. Of 17 who survived the bulbar

TABLE 7

Condition of Survivors at Reëxamination in February-March, 1942, According to Original Diagnosis; Poliomyelitis, Cuyahoga County, 1941

| Original Diagnosis | Condition at Reëxamination | | | | | Total |
|-----------------------|----------------------------|----------------------|-----------------------|---------------------|-----------|-------|
| | I | II | III | IV | V | |
| | Normal | Minimal Paralysis | Moderate Paralysis | Severe Paralysis | Bedridden | |
| | Number | | | | | |
| Spinal | 2 | 35 | 33 | 10 | 4 | 84 |
| Bulbospinal | .. | 10 | 4 | .. | 1 | 15 |
| Bulbar | 1 | 16 | .. | .. | .. | 17 |
| Abortive | 4 | 16 | 1 | .. | .. | 21 |
| Total | 7 | 77 | 38 | 10 | 5 | 137 |
| | Per cent | | | | | |
| Spinal | 2.3 | 41.7 | 39.3 | 11.9 | 4.8 | 100.0 |
| Bulbospinal | ... | 66.7 | 26.7 | ... | 6.6 | 100.0 |
| Bulbar | 5.9 | 94.1 | ... | ... | ... | 100.0 |
| Abortive | 19.0 | 76.2 | 4.8 | ... | ... | 100.0 |
| Total | 5.1 | 56.2 | 27.7 | 7.3 | 3.7 | 100.0 |

type 1 was normal and 16 had only minimal weakness. Although none of these was found to have had spinal paralysis during the acute phase of the illness, upon reëxamination 6 showed weakness of muscles of limbs or trunk only, 9 weakness of these muscles in addition to those of deglutition and speech, and 1 of the muscles of the eye.

The spinal type of the disease, which claimed no fatalities, was responsible for all of the severely paralyzed (Group IV) and 4 of the 5 bedridden.

It is instructive that only 4 of 21 who had abortive attacks were normal (Group I). One was found to have had paralysis of the abdominal muscles for which a corset must be worn, and the remaining 16 individuals were all found to have had minimal impairments of abdominal and various other muscles.

Condition by age—The percentage of recoveries (Groups I and II) was higher in individuals under 20 years of age than in those above this age. Sixty-five per cent of the persons who were under 10 years of age at the time of attack and 66 per cent of those from 10 to 19 years of age recovered with no serious paralysis. Only 31 per

cent of survivors of 20 years of age and over recovered to this extent. Because of the small number of cases this finding and the higher case fatality rate for persons of 20 years of age and over, might separately be regarded as of doubtful significance. Taken together they point to the greater severity of the epidemic among adults.

III. PROBABILITY OF ATTACK WITH RECOVERY, PARALYSIS OR DEATH

Poliomyelitis is the most feared of all epidemic diseases. Parents dread not only the possibility of a fatal outcome but also that their children may be struck suddenly by a disabling paralysis. This fear might be tempered if two facts were emphasized more generally. First, only a small proportion of the population is ever attacked by the disease. In the largest epidemic this country has experienced, that in New York City in 1916, only 2 per 1,000 of the population was attacked. In the 1941 epidemic in Cuyahoga County, the largest in its history, the attack rate was only 15.5 per 100,000, or 0.15 per 1,000. Second, fatal or severely crippling attacks occur very infrequently. Even in the younger age

TABLE 8

Chances per 100,000 Population of an Individual Having an Attack of Poliomyelitis and That the Sequel 4 to 6 Months Later Would Be (a) Minimal or No Paralysis, (b) Moderate Paralysis, (c) Severe Paralysis, (d) Death
Cuyahoga County, 1941

| Age (Years) | Minimal or No Paralysis (Groups I & II) | Moderate Paralysis (Group III) | Severe Paralysis (Groups IV & V) | Death (Group VI) | Total |
|----------------|---|--------------------------------------|--|---------------------|-------|
| Under 10 | 38.0 | 15.3 | 3.3 | 5.3 | 61.9 |
| 10-19 | 23.4 | 8.0 | 3.0 | 3.5 | 37.9 |
| 20 and over | 0.6 | 0.8 | 0.6 | 0.3 | 2.3 |
| Total | 9.0 | 3.8 | 1.3 | 1.4 | 15.5 |

groups the risks are much smaller than is generally appreciated. The findings of this epidemic may be used to illustrate this point.

In a preceding section, 137 survivors have been classified into five groups according to their condition at reexamination from 4 to 6 months after onset. Thirty-six individuals who did not report for reexamination may be distributed, on the basis of their hospital discharge records and of other facts which have been learned, into these groups as follows: group II, 25; group III, 8; group IV, 1; and dead 2. The status of all who were attacked in this epidemic can therefore be estimated with a fair degree of accuracy as follows:

Groups I and II (normal or minimal paralysis) 109, or 57.7 per cent; group III (moderate paralysis) 46, or 24.4 per cent; group IV (severe paralysis; not bedridden) 11, or 5.8 per cent; group V (bedridden) 5, or 2.6 per cent; and group VI (dead) 18, or 9.5 per cent.

By distributing the above figures by age and relating them to the populations in the various age groups, it is possible to determine the probability of an individual having an attack of poliomyelitis that within 6 months after onset would result in (a) no or minimal paralysis, (b) moderate paralysis, (c) severe paralysis, or (d) death.

These probabilities in terms of chances per 100,000 population are presented in Table 8.

In the age group most affected by the disease (under 10 years of age) the chances of an attack in which the sequel would be minimal or no paralysis was 1 in 2,600; moderate paralysis 1 in 6,500; severe paralysis 1 in 30,000; and death 1 in 19,000. With advancing age these probabilities decreased greatly. For those in the age group 20 years and over they were for minimal or no paralysis 1 in 166,000; moderate paralysis 1 in 125,000; severe paralysis 1 in 166,000; and death 1 in 333,000. It should be realized that these probabilities are approximate only and will vary somewhat from epidemic to epidemic.

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A Food-Borne Streptococcus Outbreak

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IN July, 1941, there occurred in a rural town* in eastern Massachusetts, an unusual outbreak of scarlet fever. On July 29, 2 children in a household engaged in milk production were diagnosed as cases of scarlet fever. Since there had been no scarlet fever in this community for several months and since the children had not been out of town, and the only affair attended by them was a church lunch on July 27, the source of the infection was undetermined, and they were removed to an isolation hospital. On the following day, July 30, 5 more cases were reported from a neighboring city and all of them had attended the same church reunion in this town on July 27. It was at once obvious that something unusual had occurred at the Sunday meeting and an investigation was immediately started.

ANALYSIS OF CASES

The church reunion, an annual affair, was attended by an estimated 200 people from the town, from many other municipalities in Massachusetts, and from several other states. The exact number could not be ascertained, as only about 100 registered; many did not arrive until after church services, and not all who attended the services remained for the refreshments. The names of persons attending were obtained principally from the minister's

family and from the ladies who served the refreshments. The investigation was divided into two portions. The first part was performed in the town and the neighboring municipalities by the personnel of the Division of Communicable Diseases of the Massachusetts Department of Public Health. The second portion of the investigation, in distant towns, was performed by other departmental personnel, by local health departments, and by other state health departments. Histories were obtained on all persons who could be located from the list of those present at the affair and on others who became involved in the outbreak by eating the left-over refreshments. In all, 182 case records were obtained; 144 of these attended the Sunday meeting and the remaining 38 did not attend. Of the 144 who attended, 82 were ill, an attack rate of 56.9 per cent. Of those not attending, 20 were ill, an attack rate of 52.6 per cent. Of the total 182 investigated, 102 were ill, an overall attack rate of 56.0 per cent.

The sex of 172 people was known; 99, or 57.5 per cent, were females. Of the 102 patients, 63, or 61.7 per cent, were females; there being no significant statistical difference in the attack rates of the two sexes. Similarly, there was no statistical difference in the attack rates in the different age groups, particularly when the small number of cases in each group is considered.

* U. S. Census—1940—2,275.

TABLE 1
Age Distribution
Age in Years

| | 0-19 | | 20 and Over | | Total | |
|----------|------|----------|-------------|----------|-------|----------|
| | No. | Per cent | No. | Per cent | No. | Per cent |
| Not Sick | 10 | 21.3 | 37 | 78.7 | 47 | 31.5 |
| Sick | 26 | 25.4 | 76 | 74.6 | 102 | 69.5 |
| Totals | 36 | 24.2 | 113 | 75.8 | 149 | 100.0 |

Of the 102 patients, 24 developed frank scarlet fever (Table 2), 56 sore throats, 7 diarrhea, 4 vomiting, 3 nausea, and 8 miscellaneous complaints. These groups are mutually exclusive and the patient is listed in each category according to the most severe complaint taken in this order. Eighty of the patients developed infection with the streptococcus, as well as toxemia, as manifested by the frank scarlet fever and the sore throats. Gastroenteric symptoms were predominant among these patients, suggesting the presence of an enterotoxin substance.

sisted of coffee and cream, a variety of home-made cakes contributed by the ladies of the church, and ground ham sandwiches. Drinking water was served to only a few individuals and came from the private supply of a nearby home. Some of those drinking the water were ill and some were not; however, no one was found to be ill who had drunk only the water and had nothing to eat. Moreover, there was no illness in the home where the water was obtained.

The investigation revealed (Table 3) that all persons who were ill, with one exception, had eaten either ham sand-

TABLE 2
Complaints of Patients

| Complaint | Male | Female | Both Sexes | Per cent of Total Ill |
|-----------------|------|--------|------------|-----------------------|
| Scarlet Fever * | 11 | 13 | 24 | 23.5 |
| Sore Throat | 20 | 36 | 56 | 54.9 |
| Diarrhea | 2 | 5 | 7 | 6.8 |
| Vomiting | 1 | 3 | 4 | 3.9 |
| Nausea | 1 | 2 | 3 | 2.9 |
| Miscellaneous | 4 | 4 | 8 | 7.8 |
| Total | 39 | 63 | 102 | 99.8 |

* These groups are mutually exclusive

Although the age distribution for the two groups as a whole was the same, 16 cases of scarlet fever occurred under 20 years of age and 8 cases occurred in patients 20 or over. Among the sore throat patients, however, only 6 were under 20, whereas 50 were 20 years of age or over. This distribution is explained by the lack of immunity to the erythrogenic toxin of the streptococcus in the younger age group, and is in accord with the usual experience in other streptococcus outbreaks.

The food served after the service con-

wiches or ground ham. Since only 30 per cent of those ill had drunk the coffee, and only 35 per cent had eaten of about 20 home-made cakes, there was no doubt that the illness was correlated with the ham. However, not all persons who had eaten the ham sandwiches were ill. The attack rate among those who ate the sandwiches was 72 per cent.

Of the 140 persons who ate the ham, 4 ate it immediately after it was cooked on Friday night, July 25, and none of these became ill. One hundred and

TABLE 3

Per cent of Persons Eating Foods Served at Church Reunion

| Food | 102 Sick Persons | | 47 Persons Not Sick | | 149 Total Persons | |
|-------------------------|------------------|----------|---------------------|----------|-------------------|----------|
| | No. | Per cent | No. | Per cent | No. | Per cent |
| Coffee | 31 | 30.3 | 24 | 51.0 | 55 | 36.9 |
| Cake | 36 | 35.3 | 31 | 65.9 | 67 | 44.9 |
| Ham sand. or ground ham | 101 * | 99.0 | 39 | 82.9 | 140 | 93.9 |

* Only one case did not eat the ham; she was a contact of the case which was responsible for the contamination of the food.

sixteen ate ham sandwiches at the meeting about 36 hours later, and 82 of these became ill; an attack rate of 70.6 per cent. Fourteen others ate the left-over sandwiches brought home from the meeting; 13 of these became ill, an attack rate of 92.8 per cent. Six other individuals ate some of the ground ham, which had been left over from making the sandwiches; this ham was eaten late Sunday or on Monday, July 28, either as fried ham patties or as ham sandwiches. All of these individuals became ill; giving an attack rate of 100 per cent. There is, thus, definite evidence that the attack rate increased with the passage of time and it may be assumed the toxicity of the ham increased correspondingly.

PREPARATION OF THE HAM

The bread used in the sandwiches consisted of about twenty-five loaves of sliced white bread wrapped in wax paper. The other ingredient of the sandwiches was a commercial mayonnaise which was spread on the bread at the time that the sandwiches were made. Since some of the persons who became ill ate only the ham, the other ingredients of the ham sandwiches are automatically eliminated as possible sources of infection. The ground ham consisted of meat derived from two separate 18 to 20 lb. smoked hams, which were purchased from a local meat packing establishment which had been processing a high grade of hams and bacon for over 93 years.

These hams had been purchased by the local processing house from a large

concern in Boston, their usual source of meat, and were part of a 300 lb. shipment. These hams had been cured in St. Louis and were shipped from Boston in covered barrels to the local concern, where they were kept in a frozen state for about 1 week, then thawed and hung in the smokehouse for 30 hours. Hickory and walnut wood were used for the production of the smoke. At the end of the smoking time, the hams were removed and hung to cool for 2 hours and then sold to the church committee which had ordered them on July 25. One ham was taken by Mrs. A. and the second by Mrs. B. There was no illness among other customers who purchased products from this concern.

These two ladies had cooked hams for the annual church reunions for about 8 years. Upon receiving the ham, Mrs. B. cut it into halves and placed each piece in a covered pan with enough water to cover the meat. The pans were placed over a bottled gas flame and the water was kept boiling from 9:30 a.m. to 3:30 p.m. on Friday. The ham was then removed from the water and the latter thrown away. The cooking utensils were covered aluminum kettles. When the ham was taken from the cooking vessels, it fell off the bones and was exceedingly tender. It was boned by Mrs. B. and placed in an earthenware vessel to cool and then put into a mechanical refrigerator over night. At about 10 a.m. on Saturday, July 26, it was ground on a household meat grinder which had not been used for at least a week previously and the

ground meat was replaced in the same earthenware vessels, covered with oiled paper and placed in the refrigerator. That Saturday noon, Mrs. B. made two sandwiches for herself and her husband. Mrs. C., daughter-in-law of Mrs. B., and her husband, also ate some of the ham Friday night. At the church gathering on Sunday, both Mr. and Mrs. B. ate ham sandwiches and became ill with nausea and vomiting 3 hours later.

Mrs. A. who received the second ham placed the entire ham in an "Army Cannon Boiler" with a cover. She placed this boiler over an asbestos pad which was placed over the bottled gas flame. The water which covered the ham was brought to a boil and then the gas flame was turned down so that the water simmered. The ham was started to cook at 8:15 a.m. on Friday and kept at a simmering temperature to 12:30 p.m., when the flame was turned off. Mrs. A. was able to pull a spoon-like bone out of the large end of the ham and considered this a sufficient test to determine that the ham was properly cooked. Mr. A. had cut off a slice of ham about as large as an ordinary slice of bread and about $\frac{1}{4}$ inch thick and made a sandwich which he ate for his supper Friday night. He also attended the church gathering on Sunday and ate a ham sandwich and had some coffee, but was not sick.

After the ham was cooked by Mrs. A., she was visited by her daughter, Mrs. D., and her two grandchildren, age 4 and 5. Mrs. A. served her three visitors with a piece of ham, each receiving a slice of sufficient breadth to fit about $\frac{1}{2}$ slice of bread and about $\frac{1}{4}$ inch in thickness. This slicing of the ham took place between 7 and 8 p.m. on Friday night. Neither Mrs. D. nor either of her two children was ill; and they did not attend the church nor did they eat the ground ham. The ham was left in the water all night and

was removed at 7:30 on Saturday morning. It was deboned and ground by her and her husband in a household grinder. The ground meat was placed in two earthenware bowls and taken to the church at about 2:00 p.m. on Saturday.

The two hams, cooked and ground by Mrs. A. and Mrs. B., were brought to the church on Saturday, where a distinct difference was noted between the meat from the two hams. The ground ham cooked by Mrs. A. was lighter in color and very moist; the ladies decided to mix this light, moist meat with the comparatively dry and dark meat of the ham cooked by Mrs. B. This mixing was done on each individual sandwich and not in one large bowl. A commercial salad dressing was applied to the bread at the time the sandwiches were made.

After the sandwiches were prepared by the church ladies, they were carefully wrapped in wax paper and placed in a large metal boiler which was left standing in a room in the basement of the church. On Sunday after the church service, these sandwiches and the other refreshments were served on the lawn outside the church. For approximately twenty-four hours, the ham sandwiches were at room temperature on July 26 to July 27. The maximum and minimum temperatures on these days, as recorded by the U. S. Weather Bureau for the neighboring town of Concord, were 89° and 64° on July 26 and 86° and 57° on July 27, 1941.

Mrs. A., who had prepared one of the hams, was perfectly well until Sunday, when she felt ill and as soon as the church services were over, she went home without staying for refreshments. Upon reaching home, she vomited profusely and developed diarrhea. On Monday, July 28, she awoke to find herself covered with a very red rash, which was diagnosed as a frank case of scarlet fever.

Some of the ground ham prepared by Mrs. A. was left over when the sandwiches were made, and a pound of this was sold to Mrs. McD.; this ground ham had not been mixed with the commercial dressing nor with the ham prepared by Mrs. B. Mrs. McD. had not eaten any of the ham sandwiches while they were being prepared nor at the church gathering. After the church service, Mr. and Mrs. McD. returned home, fried four ham patties, using Mrs. A.'s ground ham mixed with cracker crumbs, egg and onion. These were broiled lightly for Sunday lunch. About three hours later, both became extremely ill with nausea, vomiting and diarrhea.

Mrs. S., another woman who helped to prepare the sandwiches, purchased a half pound of ham cooked by Mrs. B. and ate it Saturday night. She also ate some of the sandwiches during the church gathering on Sunday. On Tuesday she developed an extremely sore throat. Mrs. T., however, who had also purchased some of the ham prepared by Mrs. B., ate the ham Saturday night, but did not eat any sandwiches at the church gathering and was not ill.

SOURCE OF INFECTION OF THE HAM

The evidence, as noted, indicates that Mrs. A. was in the early stage of scarlet fever at the time she handled the ham which she prepared. On Friday, about 7 hours after the flame was turned off under the boiler containing the ham immersed in the water, she removed it and cut several slices from it to feed her visitors; and thereafter replaced the ham in the water. Since only the ham which she prepared was responsible for the outbreak, it is assumed that she infected the meat, either directly by her respiratory discharges or indirectly by her hands which had become soiled by the respiratory discharges. The warm media (ham still in water overnight) incubated the streptococcus

for about 12 hours and permitted the formation of the enterotoxigenic substance. Persons who ate the ham while preparing the sandwiches became ill, but not so severely nor with such a high attack rate as those who ate the ham after it was left at room temperature for another 24 hours, thereby permitting further growth of the hemolytic streptococcus and further elaboration of the enterotoxigenic substance.

Cultures were taken from Mrs. A.'s throat, from some of the ham prepared by Mrs. A. and purchased by Mrs. McD., and from the throats of 14 patients. The cultures of 9 of the patients, of Mrs. A., and of the ham were positive for hemolytic streptococci.

The hemolytic streptococci isolated from all these sources were identified as Lancefield Group A, Griffith Type 2. Since ham was the original vehicle of infection, the hemolytic streptococci were cultured in sterile, ground ham in an attempt to demonstrate the production of enterotoxigenic substances. Sterile filtrates of such cultures contained substances which were enterotoxigenic when injected intravenously in kittens, while filtrates of uninoculated ham were consistently negative. Similarly, toxic filtrates could be prepared from ground ham and other tissue media inoculated with various bacteria. Comparative studies with erythrogenic toxins prepared from the same strains indicated that the enterotoxigenic substance was distinct from erythrogenic toxin. Non-bacterial agents such as trypsin, papain, lactic acid, and sodium hydroxide also produced toxic substances in tissue media.

The toxic substance in filtrates of such cultures was dialyzable and could be precipitated with alcohol. The active fractions and whole filtrates were heat stable and resisted a relatively wide range of pH values. Biuret, Millon, and Molisch tests with the fractions and whole filtrates were positive.

Despite the similarity of symptoms produced in kittens, the substances in filtrates of tissue cultures were distinct from staphylococcus enterotoxin. Staphylococcus enterotoxin could be produced in media such as casein hydrolysate which contained no tissue proteins. Cultivation of the hemolytic streptococci in such media did not yield a toxic filtrate. The production of staphylococcus enterotoxin is not inhibited by anaerobic conditions, whereas anaerobic incubation of the tissue media prevented the production of toxic filtrates. Digestion with proteolytic enzymes destroyed the toxicity of tissue filtrates but did not affect staphylococcus enterotoxin. Oral administration of the staphylococcus enterotoxin and the ham filtrate to kittens revealed that only the former produced a reaction, per os.

Some data were obtained which suggest that the proteins in the tissue media were split into toxic amines by the action of enzymes associated with bacterial metabolism. A detailed report of these bacteriological studies is to be published elsewhere.¹⁶

DISCUSSION

Food-borne diseases can be divided into two main divisions: (1) food infection, when the etiological agent is a living organism and the symptoms are the manifestation of the reaction of the host to the action of the infecting organism, and (2) food poisoning where the causative agent is a noxious substance which in itself is responsible for the characteristic clinical sequence. The etiological agent of food infection may be a virus, bacterium, protozoan, or helminth. Food poisoning on the other hand may be divided into two groups: (1) endogenous poisons, which are usually present in the food, and (2) exogenous poisons which are not an integral part of the food but are present as an addition to the food. These

exogenous poisons may be organic substances, such as the exotoxin of the *Clostridium botulinum*, or an inorganic compound such as sodium fluoride.

In this outbreak, gastrointestinal symptoms were outstanding in prevalence. Dick states that the first symptom of scarlet fever is a sore throat which is followed in a few hours to a few days by the sudden onset of toxic symptoms, almost always with nausea and vomiting, and sometimes diarrhea. Stimson speaks of a triad of fever, sore throat, and vomiting, as characteristic of the onset of scarlet fever. However, an analysis of 50 consecutive cases of scarlet fever treated at Belmont Isolation Hospital, in Worcester, Mass., revealed that only 20 cases (40 per cent) experienced nausea and vomiting and only 1 case developed diarrhea. In an analysis of an additional 50 consecutive cases of scarlet fever prior to hospitalization in the city of Worcester, it was found that only 12 cases (24 per cent) developed nausea and vomiting and 2 cases experienced diarrhea. The majority of these cases were due to Lancefield Group A, Griffith Type 2 streptococcus. It would seem, therefore, that scarlet fever is not as frequently characterized by gastrointestinal symptoms as reported by some authors. Even if nausea and vomiting are accepted as characteristic of scarlet fever, these symptoms were unusually prevalent in this outbreak. Nearly all of the persons with scarlet fever and septic sore throat were afflicted with nausea, vomiting, and diarrhea; and in many instances severe gastroenteritis occurred without any symptoms of sepsis or toxemia due to the erythrogenic toxin. The literature of food-borne outbreaks of scarlet fever and septic sore throat does not emphasize, and in some instances does not even mention, the occurrence of gastrointestinal symptoms. Many of these outbreaks, however, were transmitted

by milk. It is possible that ham provides a medium which is more favorable for the production of the enterotoxigenic substance as observed in this outbreak and in the laboratory procedures described.

SUMMARY

A ham-borne outbreak involved 24 cases of scarlet fever, 56 cases of septic sore throat, 7 of diarrhea, 4 of vomiting, 3 of nausea, and 8 with miscellaneous complaints as herewith reported. One of the hams was cooked by a woman who herself was in the early preëruptive stage of scarlet fever. Gastrointestinal symptoms were predominant. Laboratory analysis revealed Lancefield Group A, Griffith Type 2, hemolytic streptococci from the ground ham, from the throat of the food handler, and from the throats of 9 cases. The production of an enterotoxigenic substance from a ham substrate is discussed.

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Illness Caused by Cadmium

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OUTBREAKS of food poisoning attributed to ingestion of food contaminated with cadmium have been reported by Frant and Kleeman,¹ Cangelosi,² and the National Institute of Health.³ These foods were found to be acid in nature and were made or kept in cadmium plated utensils with a resultant solution of the cadmium by the acid food.

Recent investigations by the Department of Health of the City of New York indicate that food need not be in direct contact with cadmium plated utensils to become contaminated and cause food poisoning. Refrigerator evaporators, broiler grids, and other utensils have been cadmium plated and are more widely distributed than heretofore suspected. The following two incidents illustrate some of the recent findings in regard to such equipment:

1. On August 11, 1942, a reported food poisoning outbreak involving 3 members of a family was investigated. Severe vomiting, the only symptom, occurred within 1 hour after the meal eaten in common (supper). Recovery occurred in all cases within 3 hours. Lemonade was served at this meal; none was available for examination, but the other foods eaten in common were negative upon chemical and bacteriological examination. Lemonade was prepared in a glass pitcher, and cooled by the addition of ice cubes. The ice cube trays in the refrigerator were found to be made of aluminum.

2. On August 22, 1942, a food poisoning outbreak involving 4 members of a family was investigated.

Severe vomiting occurred $\frac{1}{2}$ hour after all 4 had consumed root beer to which ice cubes had been added. The root beer was the only food taken in common. No root beer was available for examination. Duration of illness was short with rapid recovery. A chemical poisoning was indicated. Investigation revealed that the ice cubes had been made in a defective refrigerator with a sulfur dioxide leak. A sample of ice cubes contained 769 p.p.m. of cadmium. The ice cube trays were made of aluminum.

Thus in the above two groups of food poisonings we had a reasonable suspicion in the first and a definite indication in the second that cadmium was involved, without any evidence of the preparation of food in a cadmium plated utensil. Subsequent investigation revealed that in the first group, cadmium flakes had dropped into the ice cube trays from the evaporator unit which was cadmium plated and was scaling. The investigation of the second group revealed that the sulfur dioxide refrigerant leaked and caused the refrigerator to defrost. The evaporator was cadmium plated. The moisture on the evaporator dissolved the sulfur dioxide, and the resultant acid, reacting with the cadmium on the evaporator, dissolved some of it. The acid solution of cadmium dripped into the ice cube trays, accounting for the presence of cadmium in the ice cubes. These incidents show that the cadmium plated vessels need not be in direct contact with food to be dangerous and to produce illness.

The refrigerators in both of these

cases were made by the same manufacturer. The evaporators were made of steel and had been originally plated with tin. During the guarantee period, the evaporators became rusted and were removed and sent to several platers within this city, with the specific instructions that they be cadmium plated. This manufacturer's service representative also advised several other refrigerator service men and dealers where such plating could be done satisfactorily.

The records of one electroplater revealed that at least 3,000 evaporators had been plated with cadmium for this manufacturer between 1937 and 1939. Cadmium plating had been done for many refrigerator dealers outside of New York City. The investigation led from one electroplater to another. Their records showed that cadmium plating had been done for refrigerator service men, apartment house owners, realty management companies, and private citizens, on refrigerator evaporators, refrigerator grids or shelves, broiler grids used in gas ranges, and various other utensils which do not normally come in direct contact with food. In two specific instances servicemen had asked for tinplating and got cadmium instead. The plating industry had been notified and advised previously by the Department of Health that the use of cadmium is dangerous and that the metal should not be used on food utensils and equipment.

The extent to which cadmium is used as a plating material makes a field test for cadmium a valuable aid. An acid field test is available, but was found to be unreliable. This test consists of placing a drop of dilute hydrochloric or acetic acid on a surface suspected of being cadmium plated, and adding a drop of sodium sulfide. This forms a canary yellow color if cadmium is present. While this test is useful as a screening method to distinguish be-

tween clean aluminum and cadmium plated surfaces, on surfaces such as evaporator units, which are often corroded, this test is of doubtful value because of the presence of interfering metals, particularly, tin, iron, nickel, and silver.

Goldstone⁵ devised a method which is performed easily in the field and which eliminates these interferences. This method is a refinement and adaptation of the laboratory method proposed by Coleman.⁶

It requires the following reagents:

1. *Ammonia—Sodium Nitrate Reagent*
200 ml. of ammonia water (28 per cent)
plus 100 gm. of sodium nitrate diluted
with water to 1 liter volume
2. *Sodium Sulfide Reagent*
100 gm. of sodium sulfide diluted with water
to 1 liter volume
3. *Potassium Cyanide Reagent*
100 gm. of potassium cyanide diluted with
water to 1 liter volume.

The test is performed as follows:

To a small pinch of the metal scrapings in a test tube, add 3 ml. of the ammonia-sodium nitrate reagent; bring the mixture to a boil over a flame and allow to stand for a minute or two. Pour the clear supernatant liquid into another test tube, add 1 ml. of the cyanide reagent and, after shaking, add 1 drop of sodium sulfide reagent. This produces a canary yellow precipitate if cadmium is present. The metals, iron, tin, antimony, arsenic, silver, copper, nickel, chromium, zinc, and aluminum do not interfere. In the case of zinc or aluminum, a whitish gray precipitate is formed which is readily distinguishable from the canary yellow color of cadmium sulfide. If cadmium is present in addition to any of these metals, it is instantly detected. The only metals which do interfere are lead and mercury, but these are rarely, if ever, used as plating metals under these conditions.

With the aid of this field test, a survey was made of 20 apartment houses which were equipped with suspected

refrigerators. Scrapings were taken from 104 evaporators in refrigerators in use in these apartment houses. These were tested in the field. It was revealed that 25 per cent of the number of refrigerators tested had cadmium plated parts. Samples of scrapings from 26 mechanical refrigerators where the field test indicated cadmium, were obtained and were analyzed in the chemical laboratory of the Bureau of Food and Drugs. The findings of the field test were confirmed in all cases. Control samples were also taken. The survey was extended to refrigerator repair shops, and second-hand refrigerator dealers. Here, too, cadmium plated evaporators were found. One cadmium plated evaporator was found which had been sent to New York City from a dealer who had a surplus stock in Chicago.

Conferences were held with the manufacturer of the refrigerator involved, with realty management companies, and apartment house operators using second-hand or repaired refrigerators, to acquaint them with the problem. Representatives of these companies were taught how to perform the field test, and the companies were charged with the responsibility of checking their refrigerators for cadmium plating and for rendering them safe by deplating if cadmium was found.

Cadmium as a metal is on the priorities list and its use for plating food and beverage containers is not permitted. Evaporators, refrigerator shelves, and broiler grids for gas stoves are not regarded as food containers, but if these parts of equipment are cadmium plated, food poisoning may take place.

SUMMARY

Two outbreaks of acute cadmium

poisoning are described in which 7 persons became ill with acute gastritis within $\frac{1}{2}$ to 1 hour after partaking of drinks contaminated with cadmium. In contradistinction to cases reported in the past, the drinks were not in direct contact with cadmium plated utensils, but were contaminated by ice cubes exposed to drippings and scalings from cadmium plated evaporators of refrigerators. A survey of apartment houses with a newly developed field test, shows 25 per cent of the refrigerators of one manufacturer to be cadmium plated. The records of platers revealed refrigerator shelves and broiler grids had also been cadmium plated. Evidence obtained in this investigation points to the fact that this kind of plating is being done in other cities.

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Biological Changes in Theiler's Virus of Spontaneous Mouse Encephalomyelitis*

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IN 1934, Theiler¹ isolated and described the virus which causes so-called "spontaneous" encephalomyelitis in mice. Subsequent investigations led to the discovery of a number of significant facts all of which pointed to a striking similarity between this mouse disease and the symptomatology, pathology, and epidemiology of human poliomyelitis.² The fund of knowledge which has recently accumulated from the study of human strains of poliomyelitis virus in experimentally infected rodents serves to supplement these earlier findings in a number of ways which will be briefly reviewed.

To begin with, comparison of the physical constants of simian³ or of mouse-adapted⁴ poliomyelitis virus with those of the virus of natural mouse encephalomyelitis⁵ leaves an impression that all three viruses may be morphologically alike.

Second, it can be said that the pathological process which follows infection with the murine Lansing⁶ or the murine SK⁷ strains of human poliomyelitis virus is indistinguishable from that of Theiler's disease.⁸ What seems perhaps more significant is the fact that, while there are important differences between murine and human poliomyelitis with regard to the type and distribution of

nervous lesions, the classical picture observed in monkey and man is found again in guinea pigs which have been paralyzed by the cavian strain of SK poliomyelitis virus.⁷

Third, a number of facts may be related which suggest some antigenic relationship between Theiler's virus and mouse-adapted human poliomyelitis virus even though such a relationship cannot be demonstrated with simian poliomyelitis virus.⁹ For instance, Theiler,¹⁰ as well as Young and Cumberland,¹¹ reported that cotton rats or mice following survival from a paralyzing attack of mouse encephalomyelitis showed considerable protection against reinoculation with the murine Lansing strain. While the above authors failed to observe any corresponding cross-neutralization between the two viruses, serological analysis of the murine SK strain has revealed the existence of a broad, non-reciprocal immunological relationship which embraces all three viruses (RMV, SK, Theiler) that produce paralysis in man or mouse.¹²

The set of experimental results which has just been described finds further confirmation in certain epidemiological observations. Thus, recent investigation of a localized outbreak of poliomyelitis led to the isolation of two rodent-paralyzing agents, one from a child who had died of the disease, the other from a dead house mouse encoun-

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tered in the home of the same fatal case.¹³ The two viruses, except for their different virulence in mice, possessed similar fundamental characteristics; in addition, both were neutralized by convalescent sera from surviving patients as well as by antiserum against Theiler's virus.

That the above mentioned observations indicate some intimate connection between the etiological agents of poliomyelitis in man and of Theiler's disease in mice, is a matter which can scarcely be denied. Against the flat assumption, however, that both are identical stands the fact that the two viruses are narrowly restricted, in their natural as well as in their experimental host range, to man or mouse, respectively. Despite the failure of direct transmission of poliomyelitis virus from monkey to mouse—or of Theiler's virus from mouse to monkey—it is well known that certain strains of monkey or human virus may be transferred to albino mice by means of intermediary passage through cotton rats or hamsters.¹⁴ In view of the circumstances it has seemed of interest to explore the possibilities of adapting Theiler's virus, by serial cotton rat passage, from mice to other animal species, particularly monkeys and guinea pigs. The present communication sets forth in detail the results obtained in several such experiments.

EXPERIMENTAL WORK

The virus of spontaneous mouse encephalomyelitis used in this work was the so-called GDVII strain; it was received, in its 108th mouse passage, through the courtesy of Dr. Max Theiler from the Rockefeller Foundation. The virus was maintained in this laboratory in young Swiss albino mice by intracerebral transfer of 10 per cent brain suspensions obtained from paralyzed mice in serial passage.

Periodic titrations showed that this strain was highly virulent for young

mice upon intracerebral injection (10^{-6} to 10^{-8}); however when injected by the intraperitoneal route its titer was considerably lower (10^{-1}). While the high intracerebral infectivity of the virus was well maintained over a long series of mouse passages, the degree of its peripheral invasiveness showed marked fluctuations, particularly with the advent of the summer months. Thus, between June and September of two successive years, the percentage of paralysis in mice which had been infected by the intraperitoneal route, dropped to about 10 to 20 per cent as compared with a level of approximately 90 to 100 per cent paralysis during the remainder of the year. The nature of this seasonal fluctuation is unknown.

Repeated attempts to infect guinea pigs, albino rats, or rhesus monkeys by intracerebral injection with large doses of this virus failed to produce any recognizable signs of disease. Nor was it possible to recover any active virus by sacrificing some of these animals at short intervals after injection and transferring the brain substance to albino mice.

Of three Syrian hamsters injected with the 121st or 123rd mouse passages, one animal showed paralysis of the left front leg after an incubation period of 7 days, another animal developed prostrating paralysis of both front and hind legs on the 3rd day after injection, a third hamster remained free from any symptoms. Further transmission of the infection to new hamsters proved impossible even though the presence of active virus in the brain could be demonstrated by re-transfer to mice.

Numerous experiments confirmed Theiler and Gard's original observation¹⁵ that cotton rats are uniformly susceptible to the virus of mouse encephalomyelitis. All infected cotton rats, without exception, developed prostrating paralysis from 5 to 7 days after intracerebral injection, but no symptoms

TABLE 1

General Properties of Theiler's Mouse Encephalomyelitis Virus (GDVII Strain)

| Mouse Passages | Neutralization by | | Host Range of Pathogenicity | | | | | | | | |
|-------------------|-----------------------------------|--|-----------------------------|------------------|------------|------|---------|------|-----------------------|-----------------------|--------------------------|
| | Normal Adult Mouse Serum | Normal Adult Cotton Rat Serum | Albino Mouse | | Cotton Rat | | Hamster | | Albino Rat i.c. | Guinea Pig i.c. | Rhesus Monkey i.c. |
| | | | i.c. | i.p. | i.c. | i.p. | i.c. | i.p. | | | |
| 109 | | | 10 ⁻⁷ | 10 ⁻¹ | 2/2 | 0/1 | | | 0/2 | | |
| 110 | | | | | 2/2 | 0/1 | | | | | |
| 111 | | | | | | | | | | | 0/1 |
| 112 | + | | 10 ⁻⁶ | 10 ⁻¹ | | | | | | 0/6 | |
| 113 | + | | | | | | | | | | |
| 114 | + | | 10 ⁻⁵ | 10 ⁻¹ | 1/1 | 0/1 | | | | 0/2 | |
| 115 | + | | | 10 ⁻¹ | | | | | | | |
| 116 | + | — | 10 ⁻⁷ | 10 ⁻¹ | 1/1 | 0/1 | | | | 0/4 | 0/3 |
| 117 | | | | | | | | | | | |
| 118 | + | | | | | | | | 0/2 | | |
| 119 | | | | | | | | | | | |
| 120 | | | | 10 ⁻¹ | | | | | | | |
| 121 | | | | 10 ⁻¹ | | 0/1 | 1/2 | 0/1 | | | |
| 122 | | | | | | | | | | | |
| 123 | | | | 10 ⁻¹ | | | 1/1 | | | | |
| 124 | | | | 10 ⁻¹ | | | | | | | |
| 125 | + | | | 10 ⁻¹ | | | | | | | |
| 126 | | | 10 ⁻⁶ | 10 ⁻¹ | | | | | | | |
| 127 | | | 10 ⁻⁷ | 10 ⁻¹ | | | | | | | |
| 128 | + | | 10 ⁻⁷ | 10 ⁻¹ | | | | | | | |
| 129 | | | 10 ⁻⁶ | 10 ⁻¹ | | | | | | | |
| 130 | | | 10 ⁻⁸ | 10 ⁻¹ | | | | | | | |

Numerator = number of animals paralyzed
Denominator = number of animals injected

were produced by intraperitoneal injection of large doses of mouse virus. The disease thus initiated could be maintained in successive cotton rat passages by intracerebral transfer of infected cotton rat brain and cord.

The pertinent data relating to these preliminary tests are given in Table 1.

I. TRANSMISSION OF THEILER'S VIRUS FROM ALBINO MICE TO COTTON RATS AND THE ESTABLISHMENT OF TWO FIXED STRAINS OF COTTON RAT VIRUS

Experiment I (October 31, 1941): Theiler's virus was transferred to cotton rats by using the brain of a freshly paralyzed mouse from the 109th mouse passage. The virus was carried in cotton rats through 21 serial intracerebral passages over a period of 13 months. In the first 3 cotton rat passages the incubation period varied between 5 and 4 days, in the next 3 passages between 4 and 3 days, thereafter, it became fixed at 2 days. Transfers from paralyzed

cotton rats to albino mice were carried out with the 1st, 2nd, 3rd, 6th, 9th, 15th, 17th, and 18th cotton rat passage; to guinea pigs with the 7th, 10th, 15th, 18th and 21st cotton rat passages; and to rhesus monkeys with the 3rd, 6th, 10th, and 15th cotton rat passages. Mice received the cotton rat virus by either intraperitoneal or intracerebral injection, monkeys and guinea pigs only by the intracerebral route. The results obtained with these transfers are brought together in Table 2.

It will be seen from Table 2 that the virus returned to mice from the first paralyzed cotton rat with titers of 10⁻³ intracerebrally, and 10⁻¹ intraperitoneally, but that with subsequent cotton rat passages (2nd, 3rd, 6th, 9th, 11th, 15th, 17th, and 18th) intraperitoneal titers between 10⁻⁴ and 10⁻⁶ were regularly observed; intracerebral titers continued to run at the usual level of about 10⁻⁶. Transfers to guinea pigs from earlier cotton rat passages (7th and 10th) produced no recognizable symp-

TABLE 2

Transmission of Theiler's Mouse Virus (109th Passage) to Cotton Rats
Experiment I

| Cotton Rat Passage | Date | Incubation Period | Pathogenicity for | | | |
|-----------------------|----------|----------------------|-------------------|------------------|---------------|-------------------------|
| | | | Albino Mouse | | Guinea Pig | Rhesus Monkey |
| | | | i.c. | i.p. | i.c. | i.c. |
| I | 10-31-41 | 5 days | 10 ⁻³ | 10 ⁻¹ | | |
| II | 11-7-41 | 5 days | 10 ⁻⁷ | 10 ⁻⁴ | | |
| III | 11-14-41 | 4-5 days | 10 ⁻⁷ | 10 ⁻⁶ | | { 1 paresis arm (AJ 56) |
| IV | 1-3-42 | 3 days | | | | { 1 fever |
| V | 1-7-42 | 4 days | | | | |
| VI | 1-12-42 | 3 days | | 10 ⁻⁴ | | { 1 fever |
| VII | 1-27-42 | 2 days | | | 2 negative | { 1 negative |
| VIII | 1-31-42 | 2 days | | | | |
| IX | 2-4-42 | 2 days | | 10 ⁻⁵ | | |
| X | 2-7-42 | 2 days | | | 2 negative | { 1 paresis leg (AK35) |
| XI | 2-25-42 | 2 days | | | | { 2 fever |
| XII | 2-27-42 | 2 days | | | | |
| XIII | 3-1-42 | 2 days | | | | |
| XIV | 3-3-42 | 2 days | | | | |
| XV | 3-5-42 | 2 days | 10 ⁻⁷ | 10 ⁻⁶ | 4 paralyzed | { 1 paresis leg (AK93) |
| XVI | 5-3-42 | 2 days | | | | { 2 fever |
| XVII | 8-11-42 | 2 days | | 10 ⁻⁶ | | |
| XVIII | 9-8-42 | 1 day | | 10 ⁻⁶ | 1 paralyzed | |
| XIX | 10-14-42 | 2 days | | | | |
| XX | 10-16-42 | 2-3 days | | | | |
| XXI | 11-12-42 | 2 days | | | 1 paralyzed | |

toms, but virus harvested from later cotton rat passages (15th, 18th, and 21st) proved capable of paralyzing all injected guinea pigs. Transfers from paralyzed cotton rats to rhesus monkeys induced fever or pareses of the extremities in practically all monkeys which had received virus from early as well as late cotton rat passages (3rd, 6th, 10th, and 15th). Intracerebral injection of normal cotton rat brain into monkeys produced neither fever nor any other signs of disease. Attempts to reproduce the above symptoms in continued monkey passages were unsuccessful but the virus returned readily to mice. All monkeys surviving without symptoms proved fully susceptible to intracerebral reinfection with monkey poliomyelitis virus (Ayccock strain).

The results obtained in this experiment suggest that Theiler's virus, after passage through cotton rats, had undergone a profound biological change. In other words, Theiler's cotton rat virus displayed in peripherally infected mice marked invasive properties and proved pathogenic for guinea pigs and rhesus

monkeys upon intracerebral injection, characteristics which were not observed with Theiler's mouse virus. These new properties apparently were acquired as the result of a gradual adaptation in the cotton rat as the virus was passed serially in that animal. The adaptive nature of this process is also reflected by the progressive shortening of the incubation period in successive cotton rat passages, leading to eventual fixation of the virus.

Experiment II (March 30, 1942): The second experiment was carried out with the 116th mouse passage of Theiler's virus. The virus had been freshly prepared from an earlier glycerinated 115th mouse passage brain. The virus was carried in cotton rats through 11 serial intracerebral passages over a period of approximately 2 months. During this entire time the incubation period of the disease in cotton rats remained uniformly long, fluctuating within a range of from 4 to 7 days. Transfers from paralyzed cotton rats to mice (i.c. or i.p.), guinea pigs (i.c.) and rhesus monkeys (i.c.) were under-

TABLE 3

*Transmission of Theiler's Mouse Virus (116th Passage) to Cotton Rats
Experiment II*

| Cotton Rat Passage | Date | Incubation Period | Pathogenicity for | | | |
|-----------------------|---------|----------------------|-------------------|------------------|---------------|------------------|
| | | | Albino Mouse | | Guinea Pig | Rhesus Monkey |
| | | | i.c. | i.p. | i.c. | i.c. |
| I | 3-30-42 | 5 days | 10 ⁻⁵ | 10 ⁻¹ | 3 negative | 1 negative |
| II | 4-4-42 | 4 days | | | | |
| III | 4-8-42 | 4-5 days | 10 ⁻⁵ | 10 ⁻¹ | 3 negative | 1 negative |
| IV | 4-13-42 | 4 days | | | | |
| V | 4-17-42 | 5 days | 10 ⁻⁵ | 10 ⁻¹ | 3 negative | 1 negative |
| VI | 4-22-42 | 6 days | | | | |
| VII | 4-29-42 | 5 days | | | | |
| VIII | 5-5-42 | 5-7 days | | | | |
| IX | 5-14-42 | 6 days | | | | |
| X | 5-20-42 | 5 days | | | | |
| XI | 5-29-42 | 7 days | | | | |

taken with the 1st, 3rd, and 5th cotton rat passages. The results obtained with these transfers are shown in Table 3.

It appears from Table 3 that the virus returned to mice from all three cotton rat passages tested with titers of 10⁻⁵ intracerebrally and 10⁻¹ intraperitoneally; also, that virus from the same cotton rat passages produced no symptoms in guinea pigs or rhesus monkeys.

The results of this experiment were therefore at variance with those obtained in the first experiment in that Theiler's virus, after several cotton rat passages, failed to show any increased invasiveness for albino mice and proved to be wholly non-pathogenic for rhesus monkeys. In the absence of any good reasons which might explain the discrepancy it was decided to repeat the experiment with a mouse brain passage as close as possible to the one used in the first successful experiment.

Experiment III (May 29, 1942): The 110th mouse passage of Theiler's virus was used for the third experiment. The sample employed had been freshly prepared from the 109th glycerinated mouse passage. The virus was carried in cotton rats through 12 serial intracerebral passages over a period of about 7 months. The incubation period of the disease in cotton rats changed very abruptly from 4 days in the first pas-

sage to 2 days in the second passage and thereafter was maintained at the 2-3 day level throughout all subsequent transfers. Transfers from paralyzed cotton rats to albino mice (i.c. or i.p.) were carried out with the 1st, 2nd, 3rd, 5th, 6th, 7th, and 9th cotton rat passages; to guinea pigs (i.c.) with the 2nd, 3rd, 5th, and 9th cotton rat passages; and to rhesus monkeys (i.c. or i.v.) with the 2nd, 3rd, 5th, and 10th cotton rat passages. The results of these transfers are listed in Table 4.

It may be seen from Table 4 that the virus returned to mice from all cotton rat passages tested with marked intraperitoneal potency (10⁻⁸ to 10⁻⁴), intracerebral titers being slightly above normal limits (10⁻⁹ to 10⁻⁶). Injection of guinea pigs with early cotton rat virus produced paralysis irregularly but transfer from the 9th cotton rat passage proved capable of paralyzing all injected guinea pigs. Transfers to rhesus monkeys from either early or late cotton rat passages were followed by no symptoms in four monkeys, but caused an encephalitic syndrome in two monkeys and bulbar paralysis in one monkey; the latter animal had received a large dose of cotton rat virus by the intravenous route, whereas all other monkeys had been injected intracerebrally with small doses of virus. The disease could not

TABLE 4

Transmission of Theiler's Mouse Virus (110th Passage) to Cotton Rats
Experiment III

| Cotton Rat Passage | Date | Incubation Period | Pathogenicity for | | | |
|-----------------------|----------|----------------------|-------------------|------------------|-----------------------------|---|
| | | | Albino Mouse | | Guinea Pig | Rhesus Monkey |
| | | | i.c. | i.p. | i.c. | i.c. |
| I | 5-29-42 | 4 days | 10 ⁻⁰ | 10 ⁻⁵ | | |
| II | 6-2-42 | 2 days | 10 ⁻⁰ | 10 ⁻⁶ | { 1 paralyzed 1 negative | { 1 encephalitis (AL 98) 1 negative |
| III | 6-8-42 | 2 days | 10 ⁻⁰ | 10 ⁻⁸ | 3 paralyzed | { 1 encephalitis (AM 1) 1 negative |
| IV | 6-11-42 | 3 days | | | | |
| V | 6-15-42 | 2 days | 10 ⁻⁰ | 10 ⁻⁸ | { 1 paralyzed 3 negative | { 2 negative |
| VI | 6-18-42 | 3 days | 10 ⁻⁰ | 10 ⁻¹ | | |
| VII | 7-27-42 | 2 days | 10 ⁻⁰ | 10 ⁻⁵ | | |
| VIII | 8-11-42 | 2 days | | | | |
| IX | 9-8-42 | 2 days | 10 ⁻⁰ | | 5 paralyzed | |
| X | 10-16-42 | 2 days | | | | { 1 bulbar paralysis (AM 45) after intravenous injection of virus |
| XI | 11-10-42 | 3 days | | | | |
| XII | 12-10-42 | 2 days | | | | |

be further transmitted from monkey to monkey, but the virus returned readily to mice.

The results obtained in this experiment are in agreement with the observations made in the first experiment in that cotton rat passage had evidently brought about some change in Theiler's virus which served to enhance its peripheral infectivity for mice and enabled it to induce paralysis in guinea pigs as well as encephalitis or bulbar paralysis in rhesus monkeys. As compared with the first successful experiment, the adaptation in this experiment was of an explosive character, leading to a more rapid fixation of the virus in cotton rats and to an earlier development of pathogenicity for guinea pigs and rhesus monkeys.

In view of the diverging results obtained in three different experiments it seemed advisable to repeat the transmission of Theiler's virus from mice to cotton rats once more with another mouse brain passage.

Experiment IV (July 9, 1942): The passage closest to the 109th and 110th which was available was the 113th serial mouse transfer. A fresh 114th passage

was prepared from the glycerinated brain and used for the fourth experiment. The virus was carried in cotton rats through 6 serial intracerebral passages over a period of about 5 months. The incubation period of the disease in cotton rats was uniformly long throughout the entire period, fluctuating between 8 and 5 days. Transfers from paralyzed cotton rats to albino mice were carried out with the 1st, 2nd, and 5th cotton rat passages. The results obtained with these transfers are given in Table 5.

It will be noted from Table 5 that the virus returned to mice from all cotton rat passages tested with exceptionally low potency, i.e., intracerebral titers reached only 10⁻³ and the virus failed to infect mice intraperitoneally with doses as large as 10⁻¹. The negative results of this experiment compare with those obtained in the second experiment in that Theiler's mouse virus, after passage through cotton rats, gave no evidence whatsoever of having acquired any enhanced infectivity for albino mice.

In summarizing the data available from four different experiments in which

TABLE 5

Transmission of Theiler's Mouse Virus (114th Passage) to Cotton Rats

Experiment IV

| Cotton Rat Passage | Date | Incubation Period | Pathogenicity for Albino Mouse | |
|-----------------------|----------|----------------------|-----------------------------------|------|
| | | | i.c. | i.p. |
| I | 7-9-42 | 7-8 days | 10 ⁻³ | — |
| II | 7-17-42 | 7-8 days | 10 ⁻³ | — |
| III | 7-31-42 | 5 days | | |
| IV | 8-11-42 | 6 days | | |
| V | 8-21-42 | 6 days | 10 ⁻² | |
| VI | 11-12-42 | 6 days | | |

various mouse passages of the GDVII strain of Theiler's virus were transmitted from mice to cotton rats, with subsequent serial sub-passage through cotton rats, it appears that on two occasions (109, 110 lines) the virus became fixed in the new host and, coincidental with such fixation, had acquired new biological properties. These were reflected (a) by an enhanced peripheral infectivity for albino mice, and (b) by the ability to induce various types and degrees of central nervous system infection in guinea pigs and in rhesus monkeys. A detailed description of the clinical symptoms and pathological findings in these monkeys will be found at the end of this paper. Whatever viral changes had occurred were evidently of a permanent nature since continued sub-passage of these cotton rat viruses in albino mice (10 serial mouse passages for the 109 line and 4 serial mouse passages for the 110 line of cotton rat virus) did not depress their enhanced intraperitoneal titer for albino mice. It is equally clear, however, that on two other occasions (116, 114 lines) the virus was not appreciably affected in its biological properties after having been subjected to a series of cotton rat passages.

The reasons for this discrepancy are unknown. It is conceivable that factors connected with the nature of the seed, or the receptivity of the cotton rat, or the cycle of the season spell the difference between success and failure, but

our observations offer no tangible information on any of these points. The possibility must finally be considered that the virus recovered from paralyzed cotton rats may have been a contaminating virus, derived either from a latent virus carried by the cotton rats themselves, or introduced through inadvertent infection of cotton rats with a similar virus propagated in this laboratory. The first of these two alternatives seems hardly plausible. To begin with, Theiler's cotton rat virus (110 line) was highly infectious for cotton rats not only by the intracerebral route but paralyzed these animals also by intraperitoneal injection in dilutions up to 10⁻⁷ after an incubation period of 3 days. Moreover, a series of 9 successive cotton rat passages, initiated by the intracerebral injection of heat-inactivated Theiler mouse virus and propagated serially with the brains of symptomless cotton rats, sacrificed at 5 day intervals, failed to reveal the presence of any paralyzing agent through the entire period. The second alternative cannot be lightly dismissed inasmuch as Theiler's cotton rat virus possesses certain properties in common with the murine SK strain of poliomyelitis virus previously described from this laboratory. It therefore seemed of interest to transmit SK murine virus from mice to cotton rats and maintain serial cotton rat passages for several generations, with the object of comparing the course of the infection and the nature of SK cotton rat virus with similar data

pertaining to Theiler's cotton rat virus.

Experiment V (April 23, 1942): The 273rd serial mouse passage of SK murine virus was used for this experiment. The virus was carried in cotton rats through 8 serial intracerebral passages over a period of about 8 months. The incubation period of the disease in cotton rats, beginning with the first passage, was uniformly short (2 days) and remained pegged at this level throughout the entire experiment. In spite of high intracerebral potency, SK cotton rat passage virus displayed only moderate peripheral invasiveness for cotton rats, as indicated by an intraperitoneal titer of 10^{-3} . Transfers from paralyzed cotton rats to mice were carried out with the 1st, 2nd, 3rd, and 6th cotton rat passages; to rhesus monkeys with the 1st cotton rat passage. The results of this experiment are brought together in Table 6.

As may be seen from Table 6, the

similarities between the two disease agents. Both viruses were indistinguishable with reference to their high intracerebral and intraperitoneal potency for albino mice and both were pathogenic for rhesus monkeys to various extent. They differed, however, in at least two significant respects. Thus, the transfer of Theiler's virus from mice to cotton rats assumed the pattern of an adaptive process which led to a gradual shortening of the incubation period in successive cotton rat passages, with eventual fixation of the virus; on the other hand, the transfer of SK virus from mice to cotton rats proceeded with a minimum incubation period from the first to the last passage, giving no evidence that the virus had undergone any form of adaptation. Moreover, fixed cotton rat Theiler virus was considerably more invasive for cotton rats peripherally (i.p. titer 10^{-7}) than was fixed cotton rat SK virus (i.p. titer 10^{-3}).

TABLE 6

*Transmission of SK Murine Virus (273rd Passage) to Cotton Rats
Experiment V*

| Cotton Rat Passage | Date | Incubation Period | Pathogenicity for | | |
|-----------------------|----------|----------------------|-------------------|-----------|--------------------------|
| | | | Albino Mouse | | Rhesus Monkey i.c. |
| | | | i.c. | i.p. | |
| I | 4-23-42 | 1-2 days | 10^{-7} | 10^{-6} | 2 fever |
| II | 7-7-42 | 2 days | 10^{-7} | 10^{-6} | |
| III | 7-9-42 | 2 days | 10^{-7} | 10^{-5} | |
| IV | 7-29-42 | 2 days | | | |
| V | 8-11-42 | 2 days | | | |
| VI | 10-13-42 | 2 days | | 10^{-6} | |
| VII | 11-10-42 | 2-3 days | | | |
| VIII | 12-14-42 | 2 days | | | |

virus returned to mice from all cotton rat passages tested with uniformly high intracerebral (10^{-7}) and intraperitoneal (10^{-6}) titers and caused transient fever, but no other symptoms, in the two monkeys injected with virus from the first passage.

A comparison of the results obtained with Theiler's cotton rat virus (lines 109 and 110) and with SK cotton rat virus brings out certain similarities and dis-

The above data, while demonstrating some fundamental differences between Theiler cotton rat virus and SK cotton rat virus, are admittedly insufficient to permit of clear distinction between the two disease agents. It therefore became necessary to resort to cross-protection and cross-serological tests in order to provide the basis for a sharper differentiation of the two viruses on immunological grounds.

II. CROSS-PROTECTION TESTS BETWEEN THEILER'S MOUSE VIRUS, THEILER'S COTTON RAT VIRUS, AND SK COTTON RAT VIRUS

It is well known that mice which have passed through previous infection with

10^{-2} and 10^{-6} . At the same time an adequate number of normal control mice, of similar age as the immunized mice, were infected with the three viruses in the same dosage. The results are shown in Table 7.

TABLE 7

Reinfection of Mice Immune to Theiler's Mouse Virus with Theiler's Cotton Rat Virus or SK Cotton Rat Virus

| Immunized Mice | Reinfection | | | | Controls | | | |
|--------------------------------------|---|-----------------------|-----------|----------|---|-----------------------|-----------|----------|
| | Virus | Dose i.p. | Paralysis | Per cent | Virus | Dose i.p. | Paralysis | Per cent |
| Immunized with Theiler's mouse virus | Theiler's cotton rat virus (109th line) | 10^{-2} — 10^{-6} | 35/39 | 90 | Theiler's cotton rat virus (109th line) | 10^{-2} — 10^{-6} | 35/39 | 90 |
| | Theiler's cotton rat virus (110th line) | 10^{-3} — 10^{-6} | 16/29 | 55 | Theiler's cotton rat virus (110th line) | 10^{-3} — 10^{-6} | 31/31 | 100 |
| | SK cotton rat virus | 10^{-2} — 10^{-6} | 26/27 | 96 | SK cotton rat virus | 10^{-2} — 10^{-6} | 40/40 | 100 |

Numerator = number of mice paralyzed
Denominator = number of mice used

Theiler's mouse virus, even though developing no symptoms, nevertheless acquire a relatively high degree of resistance against subsequent reinfection with the same virus. It was therefore thought that this fact might form a convenient basis for a screening test useful in separating individual virus entities belonging to a group of generally related viruses. Accordingly, an experiment was planned in which mice were actively immunized against Theiler's mouse virus and then reinfected with the three apparently similar viruses on hand, i.e., SK cotton rat virus and the two highly pathogenic strains of Theiler cotton rat virus (109 and 110 lines).

A group of 150 young mice, over a period of 2 weeks, received three doses of 0.1 ml. each of 10 per cent Theiler mouse virus by the intraperitoneal route. After an interval of 1 week, dating from the last injection, there were available for further tests a total of 95 mice (55 mice having died with paralysis during the course of immunization). The surviving mice were subdivided into three groups and reinfected intraperitoneally with either SK cotton rat virus or with Theiler cotton rat virus (109 or 110 lines), doses ranging between 0.1 ml.

As will be seen from Table 7, mice immune to Theiler mouse virus had remained fully susceptible to subsequent inoculation with either SK cotton rat virus or one strain of Theiler cotton rat virus (109 line); on the other hand, the incidence of paralysis following reinfection with the other strain of Theiler cotton rat virus (110 line) was approximately half of that occurring in corresponding normal control mice. The foregoing experiment therefore offers suggestive evidence that at least one of the two highly pathogenic strains of Theiler cotton rat virus was antigenically more closely related to Theiler's mouse virus than was SK cotton rat virus. But since the data fell short of providing a decisive answer to the problem under discussion it became imperative to carry out detailed cross-neutralization tests with the various viruses and their corresponding antisera.

III. CROSS-NEUTRALIZATION TESTS BETWEEN THEILER'S MOUSE AND COTTON RAT VIRUSES AND SK MOUSE AND COTTON RAT VIRUSES BY THEIR CORRESPONDING ANTISERA

The principle of cross-neutralization was employed in these tests in an effort

to utilize the serological reactivity of certain critical virus-antiserum combinations as a method for determining the nature of the highly pathogenic strains of Theiler's virus obtained by passage through cotton rats. It seemed reasonable to assume that such cotton rat virus should be neutralized by antiserum against Theiler's mouse virus and that some neutralization would likewise be demonstrable between Theiler's mouse virus and an antiserum against Theiler's cotton rat virus. Conversely, it might be taken for granted that SK cotton rat virus would show neutralization with an antiserum against SK mouse virus and that SK mouse virus, in turn, would be neutralized by antiserum against SK cotton rat virus. It is also clear, on the other hand, that marked cross-reactions

were not expected to occur between the two Theiler viruses and antisera prepared against the two SK viruses, or vice versa, provided the highly pathogenic strains of Theiler's cotton rat virus had been derived from Theiler's mouse virus and not from accidental contamination with SK virus.

All neutralization tests were carried out in young albino mice. The viruses were obtained from freshly harvested infected mouse brains. Antisera against the four viruses on hand (Theiler mouse virus, Theiler 110 cotton rat virus, SK mouse virus, SK 273 cotton rat virus) were produced by immunizing rabbits with slowly increasing doses of 5 to 10 per cent virus mouse brain emulsions, administered by both intravenous and intraperitoneal injection over a period

TABLE 8

Cross-Neutralization Tests with SK Mouse Virus, SK Cotton Rat Virus, Theiler Mouse Virus and Theiler Cotton Rat Virus and Their Corresponding Antisera

| Antisera | Virus 10 ⁻¹ | | | |
|---------------------|------------------------|---------------|---------------|------------------------|
| | SK Mouse | SK Cotton Rat | Theiler Mouse | Theiler Cotton Rat 110 |
| SK mouse | | | | |
| undiluted | 0/6 | 0/6 | 7/9 | 0/6 |
| 1:10 | 0/6 | 0/6 | 7/9 | 4/6 |
| 1:100 | 0/6 | 0/6 | 6/9 | 6/6 |
| 1:500 | 0/3 | 3/3 | 5/9 | 3/3 |
| 1:1000 | 3/3 | 2/3 | | 3/3 |
| SK cotton rat | | | | |
| undiluted | 1/6 | 0/6 | 5/9 | 0/6 |
| 1:10 | 1/6 | 0/6 | 7/9 | 3/6 |
| 1:100 | 2/6 | 3/6 | 6/9 | 5/6 |
| 1:500 | 0/3 | 0/3 | 8/9 | 2/3 |
| 1:1000 | 3/3 | 0/3 | | 3/3 |
| Theiler mouse | | | | |
| undiluted | 0/6 | 1/6 | 0/9 | 0/6 |
| 1:10 | 4/6 | 2/6 | 0/9 | 1/6 |
| 1:100 | 6/6 | 6/6 | 0/9 | 3/6 |
| 1:500 | 3/3 | 3/3 | 4/9 | 2/3 |
| 1:1000 | 3/3 | 3/3 | | 2/3 |
| Theiler cotton rat | | | | |
| undiluted | 0/6 | 0/6 | 0/9 | 0/6 |
| 1:10 | 4/6 | 1/6 | 0/9 | 0/6 |
| 1:100 | 6/6 | 2/6 | 0/9 | 0/6 |
| 1:500 | 3/3 | 3/3 | 0/9 | 0/3 |
| 1:1000 | 3/3 | 3/3 | | 3/3 |
| Normal rabbit serum | | | | |
| undiluted | 9/9 | 9/9 | 7/9 | 9/9 |
| 1:10 | 3/3 | 3/3 | 7/9 | 3/3 |
| 1:100 | 3/3 | 3/3 | 7/9 | 3/3 |
| 1:500 | 3/3 | 3/3 | 8/9 | 3/3 |
| 1:1000 | 3/3 | 3/3 | | 3/3 |

Technic: Antiserum and virus (SK mouse, SK cotton rat, Theiler cotton rat) were combined in amounts of 0.1 ml. each and the mixture, after incubation for 1 hour at 37° C. was injected intraperitoneally in a volume of 0.2 ml. In case of Theiler's mouse virus, 0.2 ml. of virus and 0.2 ml. of antiserum were used and the mixture was injected in a volume of 0.4 ml.

Numerator = number of mice paralyzed

Denominator = number of mice injected

of 1 month. Final bleedings were collected after a rest period of 1 week. Antisera, in various dilutions, were combined with a constant amount of virus; the mixtures were incubated for 1 hour at 37° C. and then injected intraperitoneally, in a volume of 0.2 ml. or 0.4 ml. each, into several mice. This method was chosen since preliminary tests had demonstrated that little or no neutralization was obtainable with any of these viruses and their corresponding antisera upon intracerebral injection. Normal rabbit serum was used for control purposes. The results are shown in Table 8.

The data presented in Table 8, barring some minor irregularities, are sufficiently clear and comprehensive to permit of unequivocal interpretation. It will be observed that each monovalent antiserum, in high dilutions, neutralized not only its specific virus but was also capable of inactivating its correspondingly related virus at similar levels of dilution. On the other hand, little or no cross-reactions occurred between these antisera and unrelated viruses, except with low dilutions of serum when overlapping was almost universal. For example, SK mouse virus antiserum neutralized SK mouse virus or SK cotton rat virus at titers of 1:500 or 1:100, respectively, whereas the same serum showed no neutralization or a neutralizing titer of only 1:1 with Theiler's mouse virus or with Theiler's cotton rat virus. Again, Theiler mouse virus antiserum neutralized Theiler's mouse virus or Theiler's cotton rat virus at titers of 1:500 or 1:100, respectively, while the same serum brought about neutralization of SK mouse virus or SK cotton rat virus at titers of only 1:1 or 1:10. Another approach is possible by examining the extent to which a given virus was neutralized by the various monovalent antisera. For example, SK mouse virus was neutralized by both, SK mouse virus antiserum or SK cotton rat virus antiserum, at a titer of 1:500 whereas

Theiler mouse virus antiserum or Theiler cotton rat virus antiserum inactivated the same virus at a titer of only 1:1. Conversely, Theiler mouse virus was neutralized by both, Theiler mouse virus antiserum and Theiler cotton rat virus antiserum, at a titer of 1:500 while SK mouse virus antiserum or SK cotton rat virus antiserum showed no neutralization or a neutralizing titer of only 1:1 against the same virus.* Essentially similar results were obtained with an antiserum prepared by immunization with Theiler 109 cotton rat virus.

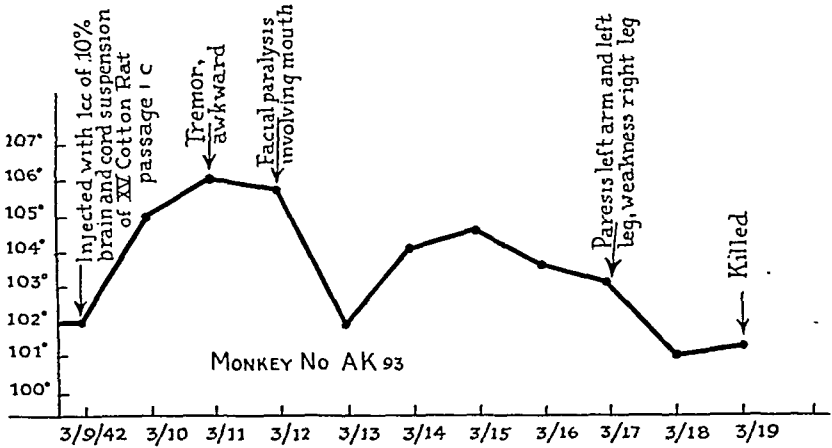
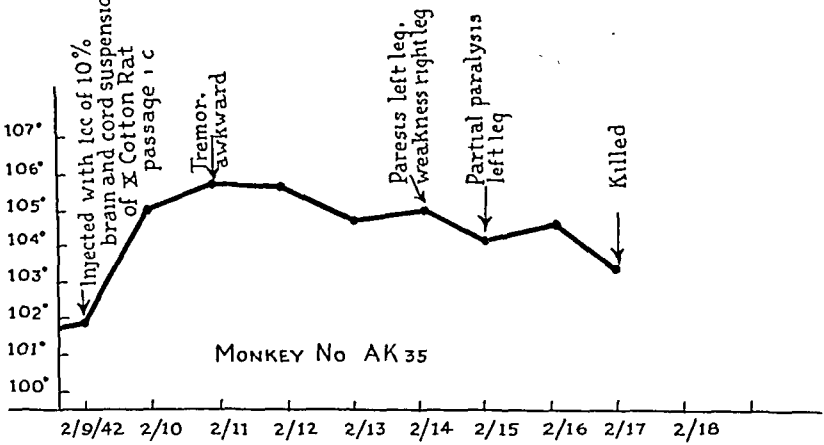
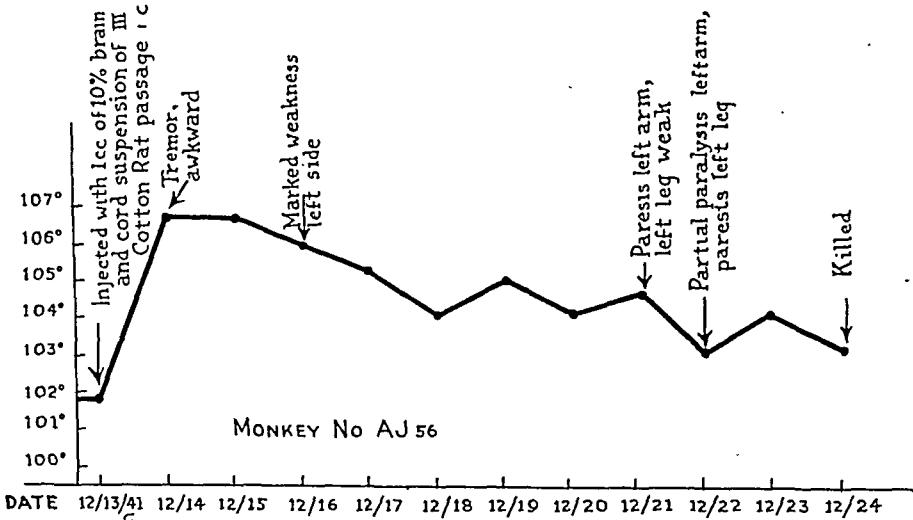
The above facts indicate clearly that Theiler's cotton rat virus is serologically identical with Theiler's mouse virus but differs markedly from SK mouse virus. It is therefore obvious that the cotton rat variant could not have been derived from accidental infection with SK virus. While differentiation is thus possible by the use of quantitative methods, the data also reveal the basic immunological relationship which exists between the various rodent viruses.

DISCUSSION

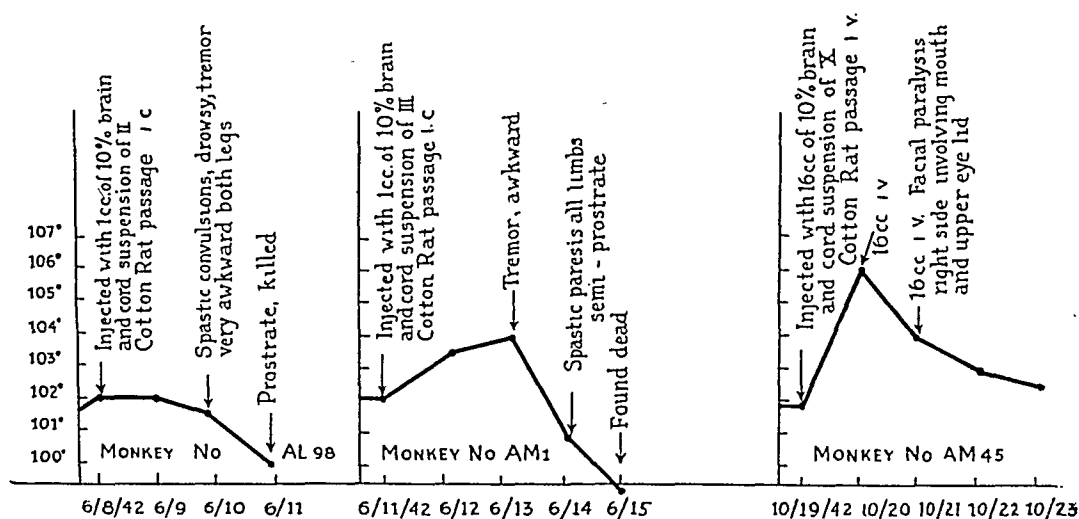
The virus of mouse encephalomyelitis—whether isolated from the central nervous system of spontaneously paralyzed mice or derived from the intestinal tract of healthy carrier mice—possesses certain basic properties which distinguish it from most other neurotropic viruses. These properties may briefly be summarized as follows: (1) limitation of natural host range to albino mice, (2) marked disproportion between high intracerebral potency and low peripheral infectivity for albino mice, and (3) specific neutralization by immune principles developed in adult mouse serum as the result of latent in-

* The total absence of neutralization between SK mouse virus antiserum and Theiler's mouse virus reported here differs from earlier observations in which some cross-neutralization had been described.¹² The fact that in this study a rabbit antiserum was used and in the earlier work a horse antiserum might conceivably account for this difference.

CLINICAL RECORD OF RHESUS MONKEYS WHICH DEVELOPED NERVOUS SYMPTOMS FOLLOWING INJECTIONS WITH THEILER'S COTTON RAT VIRUS (109th LINE)



CLINICAL RECORD OF RHESUS MONKEYS WHICH DEVELOPED NERVOUS SYMPTOMS FOLLOWING INJECTION WITH THEILER'S COTTON RAT VIRUS (110th LINE)



fection. Taken together, these characteristics attest to the nearly perfect state of symbiosis which this virus has been able to achieve with its host in the course of time.

When mouse passage strains of Theiler's virus are tested in rodents free from this virus, they also fail to exhibit any *invasive* properties despite their high intracerebral potency. Thus, intraperitoneal injection of massive doses of the GDVII strain causes no paralysis in wild-caught cotton rats even though the same animals discharged no virus with their feces and harbored no neutralizing antibodies in their serum. Interestingly enough, however, cotton rats like albino mice are also susceptible to symptomless infection with Theiler's virus by natural routes; for after prolonged laboratory contact with albino mice, Theiler's virus could readily be demonstrated in cotton rat feces. It would seem, therefore, that the low grade character of the infection, which is pathognomonic of Theiler's disease in mice, is essentially due to the action of a degraded virus rather than

to any restraining effect of herd immunity.

If it were feasible to propagate Theiler's virus systematically on virgin susceptible soil, an increase in virulence and invasiveness of the infectious agent might well be expected to occur. In other words, after serial passage through a proper intermediary host, Theiler's virus should show signs of an enhanced capacity to infect mice by peripheral routes; the gain in virulence might conceivably be sufficiently marked to permit the production of paralysis in other animal species normally refractory to the virus. It goes without saying that such newly acquired qualities could distort the familiar picture of the original virus almost beyond recognition. However, satisfactory evidence of the identity of the parent virus and its variant would be on hand provided the antigenic properties had been preserved during this process.

The data reported in this paper may be regarded as substantiating the hypothetical case outlined above. Thus, in

Pathological Record of Monkeys which Developed Symptoms of Central Nervous System Involvement following Injection with Theiler's Cotton Rat Virus (109th Line)

Monkey AJ56: Injected 12/13/41 with III cotton rat passage virus (109th line) sacrificed 12/24/41

Brain: No gross changes

Cord: Cervical level shows pinpoint hemorrhages, lumbar cord edematous

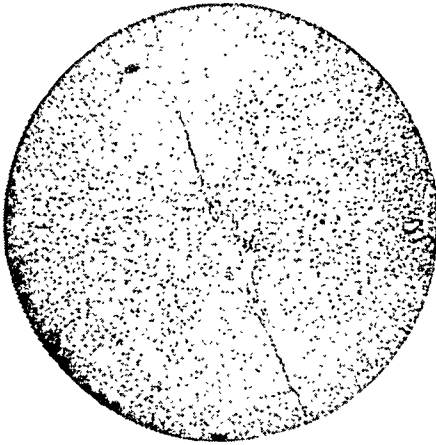
Fig. 1 Cervical cord showing unilateral lesion of anterior horn 46x

Fig. 2 Normal anterior horn 182x

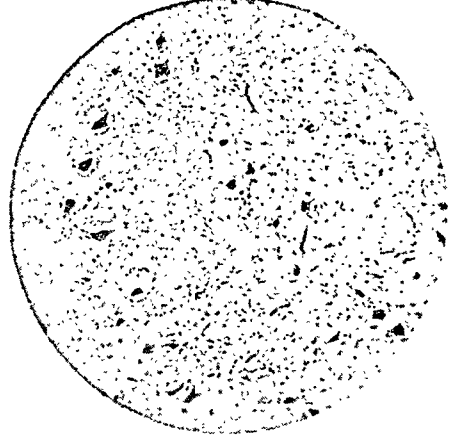
Fig. 3 Destroyed anterior horn showing hemorrhages, perivascular infiltration and nerve cell necroses 182x

Fig. 4 Ganglion cell necrosis with neuronophagia 350x

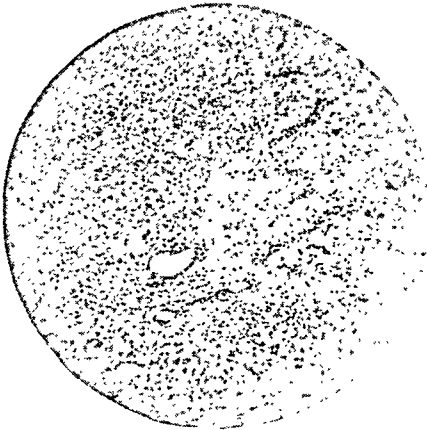
No. 1



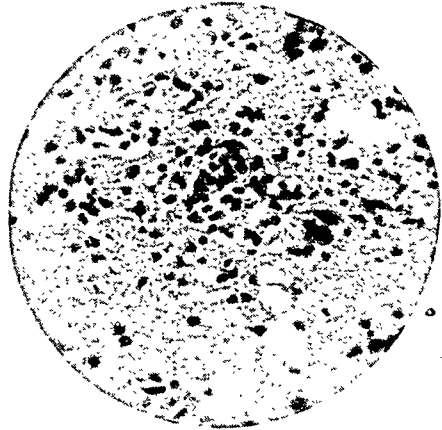
No. 2



No. 3



No. 4



two of four different experiments in which Theiler's virus was transmitted from mice to cotton rats, with subsequent serial subpassage in the latter animals, the virus became fixed in the new host and acquired new and enduring biological properties. To wit, the cotton rat strains showed greatly enhanced peripheral infectivity for albino mice and were

capable of inducing various types and degrees of central nervous system involvement in guinea pigs and in rhesus monkeys. The lesions thus produced in monkeys are interesting for more than one reason. Their selective localization in either brain or cord illustrates the wide range of neurotropic affinity while their marked tendency for unilateral distribution reveals the limited invasive

Pathological Record of Monkeys which Developed Symptoms of Central Nervous System Involvement following Injection with Theiler's Cotton Rat Virus (109th Line)

Monkey AK35: Injected 2/9/42 with X cotton rat passage virus (109th line) sacrificed 2/17/42

Brain: No gross changes

Cord: Shows pinpoint hemorrhages and edema

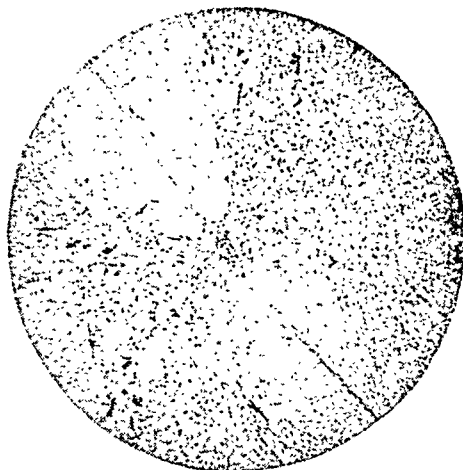
Fig. 5 Lumbar cord showing unilateral lesion of anterior horn 46x

Fig. 6 Normal anterior horn 182x

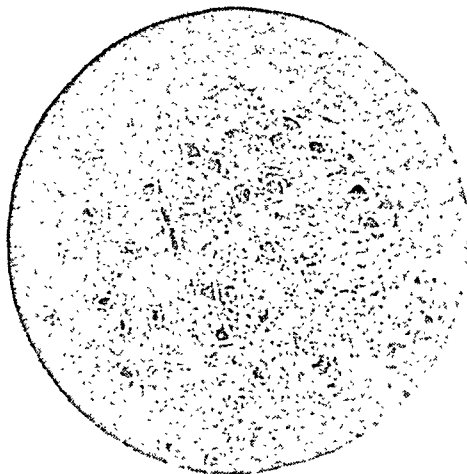
Fig. 7 Destroyed anterior horn showing hemorrhages, perivascular infiltration and nerve cell necroses 182x

Fig. 8 Perivascular cuffing 350x

No. 5



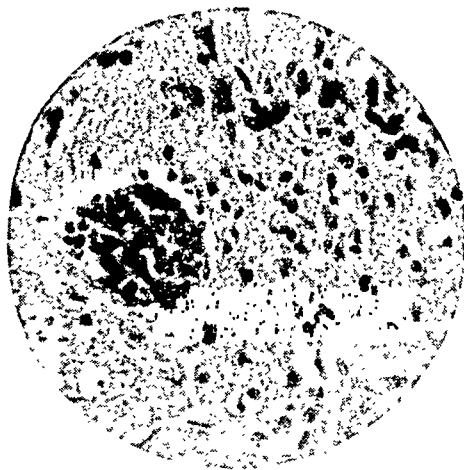
No. 6



No. 7



No. 8



power of the virus in this host. Serological analysis in which Theiler's mouse virus and its cotton rat variant were subjected to cross-neutralization tests demonstrated clearly that the two strains were essentially identical in antigenic behavior. These tests also left no question that Theiler's cotton rat virus differed from SK cotton rat virus to the same extent as did Theiler's mouse virus

from SK mouse virus. It may therefore safely be concluded that the observed transformation of Theiler's mouse virus was authentic, even if the key which controls this phenomenon is not yet at our disposal. A similar lack of regularity in results has been characteristic of all attempts to adapt human virus from monkeys to cotton rats and mice.

The process which led to these re-

Pathological Record of Monkeys which Developed Symptoms of Central Nervous System Involvement following Injection with Theiler's Cotton Rat Virus (109th or 110th Line)

Monkey AK93: Injected 3/9/42 with XV cotton rat passage virus (109th line) sacrificed 3/19/42

Brain: Slightly congested

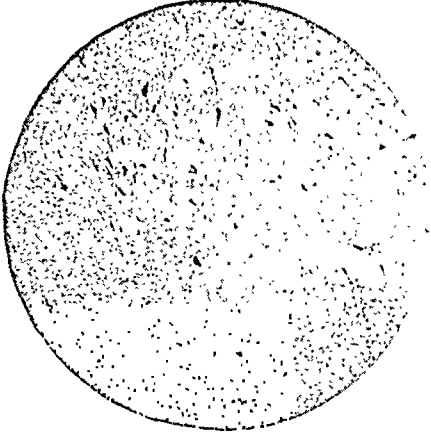
Cord: Edematous

Fig. 9 Normal tegmentum of pons (right side) 58x

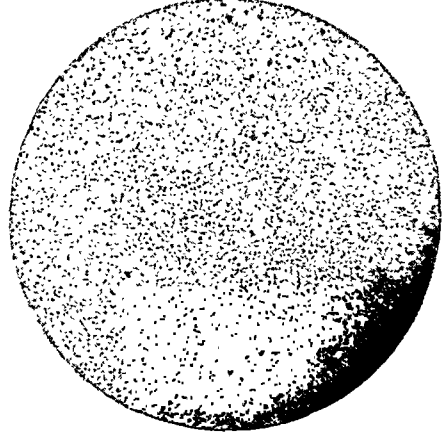
Fig. 10 Focal lesion in tegmentum of pons (left side) 58x

Fig. 11 Infiltration by lymphocytes, microglial reaction, degeneration of nerve cells 182x

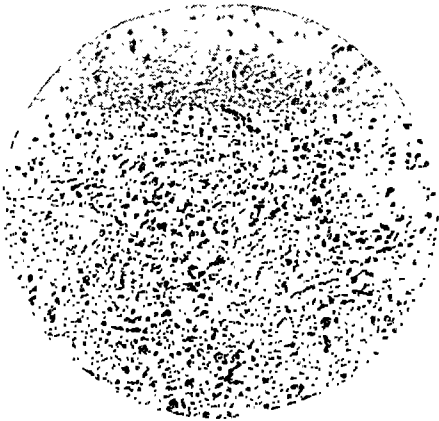
No. 9



No. 10



No. 11



Monkey AL98: Injected 6/8/42 with II cotton rat passage virus (110th line) sacrificed 6/11/42

Brain: Congested

Cord: No gross changes

Monkey AM1: Injected 6/11/42 with III cotton rat passage virus (110th line) found dead 6/15/42

Brain: Marked hemorrhagic congestion

Cord: Pinpoint hemorrhages

Monkey AM45: Injected 10/19/42 with X cotton rat passage virus (110th line) sacrificed 10/23/43

Brain: No gross changes

Cord: No gross changes

markable changes of Theiler's virus had the earmarks of an induced variation. However, while the increase in virulence was permanent for rodents, it was only transient for monkeys, thus demonstrating the intrinsic incompleteness of viral adaptation. In its fundamental aspects, this variation is not unlike the R-S variation so well known from the study of dissociation phenomena among patho-

genic bacteria. While the analogy can only be a superficial one, it is an attractive speculation to imagine that loss and gain of invasiveness in a virus may follow a relatively simple pattern, similar to what applies to the higher forms of microörganismal life.

The above mentioned facts form the nucleus of a broader biological concept which would rate the virus of human

poliomyelitis and the virus of mouse encephalomyelitis as descendants from a common primitive viral root. Because of extreme adaptation to man or mouse, both viruses have evidently emerged as essentially monopathogenic agents, incapable of producing disease in the natural host of the other. An exchange of pathogenicity, however, seems to be possible by passing these variants through a mutually susceptible environment. The term "poliomyelitis group" is therefore proposed as an appropriate designation for both the human and rodent strains. Placing these viruses together into such a system of natural classification not only does justice to their many striking similarities but opens the way for a better appreciation of the epidemiology of the human disease.

CONCLUSIONS

1. In two of four experiments, in which Theiler's virus of mouse encephalomyelitis was transmitted to cotton rats—with subsequent serial subpassage in the latter animals—the virus became fixed in the new host and acquired new biological properties.

2. These properties were reflected (a) by a marked increase in peripheral invasiveness for albino mice and cotton rats, and (b) by the ability to induce various types of central

nervous system involvement in guinea pigs and in rhesus monkeys.

3. Evidence is adduced to show that the cotton rat variant was serologically identical with the parent virus.

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The Etiology of Malignant Diphtheria

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THE clinical syndrome variously known as malignant diphtheria, hypertoxic diphtheria, and diphtheria gravis or grave diphtheria, may have been known, although under other names, for centuries. Descriptions are found in the writing of Hippocrates and in medical works of the 2nd century A.D., and elsewhere, which depict conditions agreeing more or less exactly with the modern definition of the disease. As distinguished today, malignant diphtheria is characterized usually by sudden and severe onset, with vomiting, high fever, and cardiac failure. Cervical adenopathy is marked, giving the "bull neck" commonly associated with the disease. Oral fetor and sanguinous nasal discharge are frequent, as is also albuminuria. The tonsils are usually excessively swollen, but pseudomembrane formation may be slight. *Corynebacterium diphtheriae* can regularly be obtained from the pharynx or tonsils. Drowsiness and cyanosis develop rapidly, and in spite of early, frequent, and large doses of antitoxin, death often supervenes in from 24 to 72 hours after onset. Adults and older children are frequently attacked.

The prevalence of very severe or malignant diphtheria has apparently fluctuated greatly from time to time. We may infer from writings of the early 18th century that it was a common scourge, sometimes referred to as "morbus suffocans" or "angina maligna," widespread in Europe and America. In succeeding years, the dis-

ease became less of a plague and, in the United States today, the severity of diphtheria, as well as its morbidity and mortality, is much less than formerly. In modern times, outbreaks of the malignant disease have been of a localized nature and have not spread widely, although during the period 1925 to 1935 there was a widespread increase in malignant diphtheria in Germany and other European countries. The case fatality rate in Berlin rose from about 5 per cent to around 27 per cent between 1924 and 1927.^{1,2} A large outbreak was studied in Leeds, England, in 1929-1930 by Anderson, *et al.*³ In this hemisphere a smaller epidemic of the same nature was observed in 1936 in Belair, Md., by the writer, in coöperation with physicians of the Maryland State Health Department. In 1941 a severe outbreak occurred in Halifax, N. S., and has been described by Morton,⁴ Campbell,⁵ and Wheeler and Morton.⁶ Numerous similar occurrences have been described in various parts of the globe.

The striking clinical features of malignant diphtheria as contrasted with those of the so-called "ordinary," or relatively mild diphtheria, have stimulated many workers to investigate the types of diphtheria bacilli involved in the former, with the hope of finding cultural or other properties which would explain the severity of the malignant disease, and furnish some clue as to why antitoxin is so often ineffective in such cases. Other workers have made studies on the prevalence of malignant

diphtheria and the relation of certain specific types of bacilli to it. Due to variations in epidemiological and bacteriological technics in these studies, and because of failure to define terms clearly, an unfortunate confusion has arisen between clinical and bacteriological terminology. It is one of the purposes of this paper to attempt some clarification of this situation.

Other aims of this discussion are to make additional suggestions concerning the etiology of malignant diphtheria and to present a summary of our present knowledge of the prevalence of the disease, and of *C. diphtheriae* of the so-called gravis type, in the United States.

I. CONFUSION BETWEEN CLINICAL AND BACTERIOLOGICAL TERMINOLOGY

Hammerschmidt,⁷ in 1924, differentiated 3 main cultural types of *C. diphtheriae* in Germany, but his work has remained relatively obscure, possibly because he attached no clinical importance or names to the types of diphtheria bacilli described by him. In 1931, Anderson, *et al.*, at Leeds, England³ described their now well known gravis and mitis types of diphtheria bacilli (the clinical implications inherent in these names being obvious), and indicated a causal relationship of *C. diphtheriae* gravis to malignant diphtheria.*

Confusion in terminology arose when attempts were made in various parts of the world to confirm the results of the Leeds workers. It appeared that, for

the time and place of the studies, their clinical observations and laboratory observations, regarded as separate groups of data, were correct, i.e., the severe cases were characteristic of malignant diphtheria, and bacteriological descriptions were accurate. However, while the conclusions of the Leeds workers as to the causal relationship between malignant diphtheria and *C. diphtheriae* gravis received some confirmation,⁸⁻¹⁴ many observers indicated that these conclusions were overgeneralized. For example, in other areas numerous strains *culturally* typical of the gravis type, were shown to be wholly avirulent as determined by the ordinary laboratory tests.¹⁵ Outbreaks of diphtheria were seen in which the majority of severe and fatal cases, or many of them, were said not to be due to the gravis type of bacilli, but to strains having the cultural characters of the mitis or indeterminate types.¹⁶⁻¹⁹ Patients with mild diphtheria, as well as healthy carriers, were found to harbor organisms indistinguishable from the gravis type of organism¹⁵ and several workers found little, if any, significant relationship between cultural type of organism and clinical picture.^{9, 20-25, 28-32} In addition, several workers had trouble in differentiating the cultural types of bacilli, or found them quite unstable and even interchangeable at will.^{16, 26-29}

It is difficult to evaluate most of this work because only two or three writers described their types of *C. diphtheriae*

* A rather close similarity may be noted between Hammerschmidt's group A and the mitis type of Anderson, *et al.*, and between the group C of the former and the gravis type of the latter. The differential characters used by each for distinguishing their principal groups or types were as follows:

| Author | Type or Group | Colony on | Hemolysis | Growth in Broth | Final Reaction in Broth † | Fermentation of | | Pellicle formation |
|-------------------------|---------------|----------------|--------------|-----------------|---------------------------|-----------------|----------|--------------------|
| | | Tellurite Agar | in Test Tube | | | Starch | Glycogen | |
| Hammerschmidt | Group A | smooth | + | even turbidity | alkali | | | |
| Anderson, <i>et al.</i> | Mitis type | smooth | + | even turbidity | acid | — | — | — |
| Hammerschmidt | Group C | rough | — | granular | acid | | | |
| Anderson, <i>et al.</i> | Gravis type | rough | — | granular | alkali | + | + | + |

† Most of Hammerschmidt's findings regarding types have been confirmed, but his results with regard to reaction in broth have not.

TABLE 1

| <i>Authors</i> | <i>Criteria Used to Determine Gravis Types by Authors Cited</i> | <i>No. of Gravis Strains, According to Varied Criteria among 237 Cultures of All Types</i> |
|--|--|--|
| Parish, Whatley, and O'Brien ²² | Starch fermentation, pellicle formation | 19 |
| Christison, Wright, and Shearer ²⁸ | Starch fermentation, colony form | 9 |
| Dockeray ²⁰ | Starch fermentation | 43 |
| Tannhil ¹⁷ | Starch, colony, pellicle | 6 * |
| Mair ²⁷ | Same as above | 6 * |
| Schiff and Werber ¹² | Starch, colony, pellicle, hemolysis | 6 * |
| Carter ¹⁵ | Glycogen, starch, colony | 6 † |
| Wright and Rankin ²³ | Glycogen, starch, colony, morphology, hemolysis | 6 † |
| Gregory ⁶⁹ | Starch, colony | 9 |
| Anderson, <i>et al.</i> ³ (original Leeds workers) | Glycogen, starch, colony, morphology, pellicle, hemolysis, reversion of pH | 4 |

* † The 6 strains in each group marked with an asterisk were the same, but were entirely different cultures from the 6 strains in the 2 groups marked with a dagger. Which are the true gravis strains?

in exactly the same terms. Many give no cultural details at all, and others are widely divergent in this respect, not only from each other but from the original, 1931, description as well. The difficulty is partly illustrated in Table 1. This table was prepared by applying the varied criteria used by several different writers for identifying gravis strains of diphtheria bacilli, to a group of 237 cultures studied by the author and his coworkers in Baltimore. All the significant characters of the latter cultures conformed to the original Leeds description and all had been determined in one laboratory. Obviously, the interpretations of many authors are open to question. In 1939, diphtheria in Leeds was restudied.³³ In the new study, however, a modified method of type determination was used, which is unfortunate in view of the confusion which had already arisen. The situation is not clarified by the recent review by one of the Leeds workers.³⁵

The importance of uniform technic has previously been pointed out: "If reports upon the occurrence of gravis

and mitis and intermediate types of *C. diphtheriae* in different parts of the world are to be comparable, the criteria of identification must be equivalent. The designations are not valid unless the strains under consideration have been shown to conform fairly closely to the criteria originally set up by Anderson, *et al.*, as characteristic . . . Failure of many investigators to describe in detail the full complement of the biochemical characters of their 'gravis,' 'mitis,' and intermediate types, or the methods by which they were determined, or both, renders almost fruitless much of the work in the field."³⁴

Because there has been such diversity of opinion as to the exact meaning of the terms *C. diphtheriae* gravis and *C. diphtheriae* mitis, it has been thought desirable to state clearly what is implied in our own use of these terms. In the present report, as in previous studies by the same author and his coworkers, strains of *C. diphtheriae* have been classed as mitis or gravis if, in addition to possessing the usual morphological and fermentative properties of *all* cul-

tures of *C. diphtheriae*, they have reacted as follows when tested by methods previously described.³⁴

| | <i>Gravis</i> | <i>Mitis</i> |
|--------------------------|---------------|----------------|
| Fermentation of starch | + | — |
| Fermentation of glycogen | + | — |
| Colony | rough | smooth |
| Hemolysis (broth) | — | + |
| Final pH in broth | 7.5 or above | 7.4 or below |
| Growth in broth | granular | even turbidity |
| Pellicle | + | — |

These are the characters (except morphological details generally found to be of little differential value) originally described by the Leeds workers. In our usage, individual strains of either the mitis or gravis type *may or may not be virulent*, and they may come from any source. Cultures classed as gravis-like or mitis-like may be lacking in one or two of the more variable characters such as final pH, hemolysin production, or pellicle formation. Indeterminate strains are those which are not predominantly mitis-like or gravis-like in character. The so-called intermediate type is included by us with indeterminate strains. It might be stated also that, although some strains retain their gravis or mitis characters with some tenacity, in our hands many have changed greatly and are quite variable.

The definition given above, while in disagreement with some other writers, has the virtues of clarity and of agreement with the *original* description in point of cultural characters, if not in regard to virulence and source. *C. diphtheriae* gravis, as the term has been used by us, is thus clearly defined as a cultural variety without regard to any clinical or epidemiological significance. Additional reasons for thus divorcing biological properties from all clinical or epidemiological implications will be given farther on in this paper.

In addition to misunderstandings arising from misuse of bacteriological terms as just described, clinical ambiguity has arisen from use of the term "gravis diphtheria" or "diphtheria

gravis" with inadequately defined meaning. One should state clearly whether, by gravis diphtheria, he means a case of diphtheria characterized by all (or only some) of the clinical features of the malignant disease, as set forth in a foregoing paragraph, without regard to the cultural type of diphtheria bacilli present, or whether, regardless of clinical features, he means a case from which a strain of *C. diphtheriae* culturally of the gravis type was isolated, or whether, on the other hand, a malignant case associated with bacilli having the cultural properties of *C. diphtheriae* gravis is meant. The question has also been raised whether the terms "gravis diphtheria" and *C. diphtheriae* gravis should not be restricted to cases and cultures occurring during *epidemics* of the malignant disease. This uncertainty further complicates both clinical and epidemiological discussion, to say nothing of perplexities arising from serious doubts, to be discussed presently, as to the ability of *C. diphtheriae* gravis, per se, to cause malignant diphtheria at all. These difficulties have not been very fully discussed by McLéod in his review of the present status of the gravis and other types of *C. diphtheriae*,³⁵ and seem to have been almost wholly unknown to the writer of a recent rather naive editorial on the subject.³⁶

II. THE ETIOLOGY OF MALIGNANT DIPHTHERIA

1. *Relationship of C. diphtheriae gravis to the disease*—As noted above, serious objections have been raised against accepting *C. diphtheriae* gravis as the *sine qua non* of malignant diphtheria. Several experimental and other details are of special interest in this connection. For example, one of the salient features of malignant diphtheria is refractoriness to diphtheria antitoxin. This has been ascribed by some to a peculiarity of the exotoxin of *C.*

diphtheriae gravis. However, experimental investigations^{14, 22, 25, 37} of this matter have shown conclusively that the exotoxins of all known types of *C. diphtheriae* are qualitatively identical. Zinnemann and Zinnemann,¹⁴ reporting a series of investigations on the use of commercial toxoid and antitoxin in the control of hypertoxic diphtheria stated that ". . . in work on guinea pigs the preparations in common use today are of value in controlling both infections with gravis strains, and gravis intoxications." This is in agreement with earlier findings of Parish, Whatley, and O'Brien.²²

Curiously enough, experimental evidence also indicates that gravis strains of *C. diphtheriae* are often inefficient toxin producers in laboratory media.^{38, 39, 40} Not only are they poor toxin producers under such circumstances but, as shown by studies conducted in this laboratory, many strains are completely atoxigenic as ordinarily tested. This was the case, for example, in 1938-1939 in Virginia, where 7 of 11 carrier cultures of the gravis or gravis-like types were avirulent, while in Alabama, 28 of 40 carrier cultures of the same variety were avirulent.⁴¹ Although virulent gravis strains were common in the populations investigated, diphtheria morbidity was very low indeed and malignant diphtheria entirely absent so far as can be determined. Later studies showed that the presence of virulent gravis strains was not significantly associated with malignant diphtheria elsewhere in the United States at the time the studies were made.

Obviously, the mere presence alone of diphtheria bacilli which are culturally of the gravis type, at least in the form in which they appear in laboratory cultures as at present prepared, is not in itself sufficient to cause malignant or hypertoxic diphtheria, although the organisms appear to be associated with the disease in certain outbreaks. We

are therefore led to the conclusion that malignant diphtheria is due to (a) some property of *C. diphtheriae* other than any of these demonstrated in the laboratory by methods currently in use, or (b) some wholly extrinsic agent or agents acting in combination with *C. diphtheriae*, or (c) variations in host resistance.

2. *Factors possibly responsible for the malignancy of diphtheria*—If we arrange the factors involved in the development of malignant diphtheria in their natural relationship to each other, we might formulate an equation somewhat as follows:

$$\frac{\text{Toxicogenicity of } C. diphtheriae + X}{\text{Host resistance}} = \text{Malignant diphtheria}$$

Attention may first be directed toward factor "X." This represents various hypothetical elements in addition to the familiar exotoxin of *C. diphtheriae*. In attempting to solve the equation we may try various factors in the place of X.

A. *Synergistic infecting agents*—One of the factors which might replace "X" is an infective agent acting synergistically with *C. diphtheriae*, possibly more effectively (or more frequently) with the variety called gravis than with other varieties. In this connection, we may recall many observations published some decades ago in France and Germany, indicating that streptococci were suspected of contributing to the severity of diphtheria. However, in the absence of exact methods of identifying streptococci (the blood agar plate was introduced for this purpose by Schottmüller in 1903⁴² while what is now termed the beta type hemolytic streptococcus was clearly differentiated by Smith and Brown⁴³ only in 1915), we have no exact data, from the earlier period, concerning the true nature of streptococci supposed to be of pathological or epidemiological significance

in malignant diphtheritic conditions. However, several of these papers are of interest.

Barbier,⁴⁴ in 1891, recognized the existence of two clinical types of diphtheria, malignant and mild, and performed numerous experiments to discover the rôle of streptococci in the former. He concluded that streptococci (a) prepare the ground for *C. diphtheriae*, and (b) form an "association microbienne redoubtable" with this organism, resulting in a malignant infection.

Bernheim,^{45, 46} like many modern clinicians, observed cases of malignant diphtheria in which early and adequate dosage with antitoxin was of no avail. He also was convinced, by his clinical observations and laboratory studies, that streptococci were the organisms responsible, with diphtheria bacilli, for causing malignant diphtheria. Roux and Martin⁴⁷ had expressed the same opinion a little while earlier. Several other workers of the same period, including Funck⁴⁸ and Hilpert,⁴⁹ were in agreement with these ideas on the basis of both clinical and experimental observations, although there was some diversity of views on the exact mechanisms by means of which the organisms acted jointly.

Later workers likewise recognized malignant, antitoxin-refractory diphtheria as a distinctive clinical entity and many, like their predecessors, believed streptococci to act synergistically with *C. diphtheriae* in such cases. Borman^{50, 51} was one of these, contemporary with the 1931 Leeds report on gravis type bacilli. He cites many workers who, like himself, achieved laudable therapeutics with a serum ("symbioseserum") prepared by injecting animals with mixtures of streptococcal and diphtheritic antigens. Grabenhofer⁵² also was impressed with the value of such treatment. Hopmann and Panhuysen⁵³ admitted the import-

ance of streptococci in malignant diphtheria.

In this country, according to Goepp,⁵⁴ the chief cause of "difference in the virulence of diphtheria" is "the association of other pathogenic germs with the *Bacillus diphtheriae*, such as staphylococcus, streptococcus, pneumococcus, and *B. coli communis*. The most virulent cases are those in which streptococci are present." Park, Williams, and Krumwiede⁵⁵ cited two cases of antitoxin-refractory diphtheria in which there were "massive membranes of hemolytic streptococci . . . as well as diphtheria bacilli. Both cases developed a fatal streptococcus septicemia." These authors further state (p. 397) that ". . . when other pathogenic bacteria are associated with diphtheria bacilli they mutually assist one another in their attacks on the mucous membrane, the streptococci being particularly active in this respect, often opening the way for the invasion of the diphtheria bacillus into the deeper tissues or supplying needed conditions for the development of its toxin. As these septic infections due to the pyogenic cocci are in no way influenced by the diphtheria antitoxin, they frequently are the cause of the fatal termination." In malignant cases occurring at Belair, Md., and studied by the author, *the provisional clinical diagnosis in two had been septic sore throat or scarlet fever*, and large numbers of Lancefield group A,⁵⁶ actively fibrinolytic,⁵⁷ hemolytic streptococci were present. A similar case was recently (1943) observed* in the Johns Hopkins Hospital. Curiously, Lancefield group B streptococci were present, with a mitis type of *C. diphtheriae*. About 165,000 units of antitoxin had but little visible effect on the condition of the patient, who eventually recovered. Sulfathiazole therapy was insti-

* Courtesy of Dr. Russell A. Nelson, Associate in Preventive Medicine, The Johns Hopkins University.

tuted early in the course of treatment. Streptococci of group B were isolated from a child who came to autopsy in January, 1943, at Baltimore, following diphtheria with moderately developed clinical features of the malignant disease.* Mitis type diphtheria bacilli accompanied the streptococci. In other cases, of lesser malignancy, strongly fibrinolytic group A, C, and G streptococci have been found.

Cases of "hemorrhagic diphtheria" such as those described by Hannah⁵⁸ and by Frank and Hartmann⁵⁹ might represent diphtheritic infections combined with toxigenic group A streptococci in persons who, if tested, would have given positive reactions to both Dick and Schick toxins. However, the rôle of the erythrogenic toxin of streptococci, whose relationship to scarlet fever and septic sore throat has been admirably summarized by Maxcy,⁶⁰ remains to be determined for diphtheria. Degrees of malignancy in combined infections might depend on the anti-fibrinolysin or mouse-protective⁶¹ titer of the patient's blood serum. The relation of streptococci to malignant diphtheria obviously needs additional investigation.

In further consideration of synergistic agents in general, attention may be directed to the possibilities implied in Shope's discovery of the dual (virus-bacterial) etiology of severe or malignant swine influenza,⁶² and the probable synergistic or accessory rôle of bacteria (*Salmonella* and *Pasteurella*) in the virus disease hog cholera.⁶³ There is little to suggest the action of a virus in malignant diphtheria, but the possibility should not be overlooked.

B. Variations in C. diphtheriae—A second possible factor in the etiology of malignant diphtheria might be the oc-

currence of an alteration in strains of *C. diphtheriae* prevalent in a given area, such that they acquire a greatly enhanced pathogenicity. Direct evidence for such an occurrence among diphtheria bacilli, especially in nature, is lacking, although fluctuations in virulence of many other species of bacteria in the laboratory are matters of common knowledge. Indirect general evidence and theoretical support for the view that such changes may occur (in infective agents other than *C. diphtheriae*) in nature, are to be found in the publications of Frost,⁶⁴ Greenwood, Topley, *et al.*,⁶⁵ Webster,^{66, 67} and others. The sudden acquisition of a capsule, or of a somatic constituent analogous to the Vi-antigen of *Escherichia typhosa*, through the mechanism of bacterial variation, might confer greater pathogenic powers. Either occurrence is a biological possibility, but neither capsules nor distinctive noxious somatic substances have ever been satisfactorily demonstrated in diphtheria bacilli isolated from cases of malignant diphtheria. However, they may disappear during artificial cultivation as at present practised.

C. Special toxic properties of C. diphtheriae gravis—A third possible value for the factor X might be derived from greater toxigenicity or from toxic substances other than the exotoxin ordinarily considered characteristic of *C. diphtheriae*. As previously stated, adequate studies have shown the exotoxin of *C. diphtheriae* gravis, whether the strains tested were derived from malignant cases or from carriers, to be qualitatively identical with the exotoxin of Park 8 strains commonly used for commercial toxin, toxoid, and antitoxin production. Further, it has been shown that many gravis strains (when not completely atoxigenic), whether case strains or carrier strains, are rather poor toxin producers under ordinary conditions of test.

* Courtesy of Dr. John E. Gregory and Mrs. Isabelle G. Schaub, Department of Pathology and Bacteriology, School of Medicine, The Johns Hopkins University.

However, Mueller³⁸ has presented data suggesting that previous views on toxin production by gravis diphtheria bacilli may require revision. His idea is based partly on the observation by Pappenheimer and Johnson⁶⁸ that minute, but nevertheless excessive, amounts of iron interfere with good toxin production by ordinary strains of *C. diphtheriae* in various media. Mueller obtained a rough approximation of the iron content of a bit of pseudomembrane from a single case of diphtheria due to gravis type bacilli and found it relatively large. He suggested that malignant diphtheria might be due to infections with strains of *C. diphtheriae* which, unlike other strains, are capable of producing toxin in undiminished amount in spite of the excess of iron in the membrane, and that this property might be characteristic especially of gravis type bacilli. Tests *in vitro* with a single gravis strain supported his suggestion. This interesting line of experimentation could profitably be extended to a more conclusive result.

Several authors have reported a greater invasive property in gravis strains of diphtheria bacilli (presumably culturally typical strains from cases of malignant diphtheria), but the evidence on this point is far from convincing. For example, Zinnemann and Zinnemann,¹⁴ Robinson and Marshall,⁹ and Clauberg and Plenge⁶⁹ and others reported finding these organisms more frequently in the internal organs of artificially infected animals and in persons dead of diphtheria than was the case with mitis strains, but their figures lack statistical significance. In a series of autopsies on human diphtheria victims, McLeod, *et al.*,³³ never found diphtheria bacilli in the spleens or livers, but gravis strains were more frequent in lung infections than others. It was stated that in the throat there is "marked penetration (by *C. diphtheriae* gravis) into the deeper tissues,

while at the same time the surface reaction is less efficient." In the deeper tissues, exotoxin might be more readily and completely absorbed than from surface membranes. These authors suggest that the greater penetrating power (assumed) of the gravis type of organism "may very possibly be due to toxic elements of which we have not yet got sufficient knowledge." It is of interest to contrast this suggestion with the statement of Park, Williams, and Krumwiede, before cited, concerning the rôle of streptococci in facilitating the passage of diphtheria bacilli into the deeper tissues.

O'Meara^{70, 71} concluded that the gravis type of *C. diphtheriae* produces a special toxic substance ("B substance") which acts somewhat like the spreading factor of Duran-Reynals,^{71a} and also synergistically in combination with the usual exotoxin ("A substance"), the combination producing both greater extension of the toxin and also an enhanced effectiveness of the latter. McLean⁷² has found "No evidence—of any association between diffusing factor or hyaluronidase and substance B postulated by O'Meara . . ." Curiously, the so-called B substance, although spoken of as "an integral part of the exotoxin," was not sought for and demonstrated by him in the usual toxic filtrate, but *in saline extracts of bacilli* grown on Loeffler's slants. The B substance is said to combine with the few B antibodies (hypothetical) which may by good fortune be present in ordinary commercial antitoxin, thus lowering its therapeutic effectiveness. On the basis that B substance is present in diphtheria toxin, has different combining properties from those of the A substance, and varies in amount in different toxins, the writer explains at one Ehrlich's phenomenon, antigenic inadequacy of some ordinary toxoids, failure of ordinary antitoxin, Danysz's phenomenon, and some other details.

Unfortunately, the rather indefinite experiments which form the basis for the main conclusions are not fully controlled and the tabulated data do not give strong support to the statements concerning them. Because this report is among the most recent ones, and because it received rather wide notice in this country,⁷³ attempts were made in this laboratory to duplicate O'Meara's results. The attempts failed completely. Details appear elsewhere.⁷⁴ Discordant results were also obtained by Povitsky, *et al.*⁷⁵ No confirmatory reports have come to our attention so far.

3. *Alterations or defects in host resistance*—Giving, finally, some attention to the denominator of the fraction discussed in a foregoing paragraph, we may first consider the possibility that cases of malignant diphtheria develop in persons with some defect, or temporary reduction, in resistance. Zinsser, Enders, and Fothergill⁷⁶ state that they "are inclined at the moment to regard it (malignant diphtheria) as a fulminating type of infection that may, in large part, be due to host factors in the sense of variation in susceptibility." Susceptibility might easily vary significantly for several reasons such as (a) an absence of adequate natural and artificial antigenic stimuli, (b) dietary deficiencies (especially vitamin C), (c) extreme fatigue such as might attend a prolonged military effort or winter naval maneuver followed by arrival at an infected port, and (d) congenital mechanisms. It is impossible to evaluate these factors with any satisfactory degree of accuracy. We merely append references to discussions by authors who show that many of these factors might affect host resistance against infectious disease in general, or against diphtheria in particular,^{77-86a} (e) Atwater⁸⁰ suggested that antibacterial immunity might be an important factor in diphtheria, especially in children supposedly immune, who develop the

disease. The present status of antibacterial immunity has been reviewed by Frobisher and Parsons.⁹¹ The rôle of host resistance to group A streptococci as a possible synergistic agent in malignant diphtheria has received too little consideration.

By way of summary of the foregoing sections of this paper, we may say that the pathogenesis of malignant diphtheria remains obscure. Certain promising lines of investigation are indicated, especially the rôle of hemolytic streptococci in the disease, and the toxigenic properties of certain strains of *C. diphtheriae* in relation to the iron content of their environment. The rôle of antibacterial immunity also deserves further investigation.

III. DISTRIBUTION IN THE UNITED STATES OF DIPHTHERIA BACILLI HAVING THE CULTURAL PROPERTIES OF *C. DIPHTHERIAE* GRAVIS

Since the gravis type of *C. diphtheriae* has been so widely thought of as causing, or at least being closely associated with, malignant diphtheria, it is of interest to note the results of bacteriological surveys for diphtheria bacilli carried out in various places in the United States during the past decade. These have shown that carriers of gravis strains of *C. diphtheriae*, virulent or avirulent, were relatively uncommon in the country as a whole. In Baltimore, in studies made from 1933 to 1937, only 12 strains of gravis-like organisms (virulent and avirulent) were found among 237 cultures from cases, contacts, and carriers.⁸⁷ cultures from carriers in this city were often atoxigenic. Later surveys (1940) in the same area showed that little significant change had occurred in the interval. In New York City, the situation in 1940 closely paralleled that of the Baltimore area in the same year.³¹

More widespread sampling of the

diphtheria flora in the United States as a whole during 1939-1941 yielded similar results.⁴¹ Of 178 cultures of *C. diphtheriae* obtained from various clinical cases (none malignant so far as is known), and the immediate contacts thereof, during the fall, winter, and spring months of 1939-1940 and 1940-1941, in areas scattered from coast to coast and from Minnesota to Mississippi, only about 1 in 12 (8.4 per cent) was an organism having all or most of the principal cultural properties of *C. diphtheriae* gravis. Among the other cultures, 134 (77.5 per cent) were of the mitis or mitis-like types and 25 (14.1 per cent) of indeterminate character. Gravis strains were equally in the minority in a collection of 181 cultures from normal carriers collected during the same period in Alabama, Baltimore, New York City, and Salt Lake City. Of these cultures, 13 (7.1 per cent) were gravis or gravis-like and only 147 (81.2 per cent) mitis-like. The remaining 11.7 per cent were indeterminate. Of the whole collection of 452 cultures isolated from all sources during the 1939-1941 surveys (178 from cases and their contacts, 181 from carriers, and 93 from sources grouped as "unknown") only 38 (8.3 per cent) were gravis-like, while 361 (80.2 per cent) were mitis-like, both virulent and avirulent strains being included. If consideration be given also to indeterminate strains, the ratio of all non-gravis strains to gravis-like is about 12 to 1.

It will be noted that many cultures collected in these surveys have been referred to as gravis-like or mitis-like. These terms may be rather too inclusive. If the discussion be confined exclusively to those cultures having all of the specific characteristics of *C. diphtheriae* gravis as originally described, and to virulent strains only,* but including cultures from both "mild" and "severe" cases and car-

riers, the ratio of all non-gravis to virulent gravis would increase to about 75 to 1.

DISCUSSION AND SUMMARY

A review is given of the origin of the names *C. diphtheriae* gravis and *C. diphtheriae* mitis and of the concept that the former organism is causally related to malignant (gravis) diphtheria. Confusion arising from the adoption of varied definitions and bacteriological technics in studying these organisms, and their clinical relationships, is described.

In view of this confusion, it is here suggested that the term gravis diphtheria (or diphtheria gravis or grave diphtheria) be abandoned forthwith in favor of the term malignant diphtheria. It would also seem logical that the names of *C. diphtheriae* gravis and *C. diphtheriae* mitis be discontinued, first, as binomials not in conformity with the *International Rules of Botanical Nomenclature* and second, as bearing clinical implications which are not supported by adequate data. However, convenience and usage may dictate their continuance.

The various cultural types of *C. diphtheriae* could conveniently be designated by Roman numerals. Schemes of this sort have been advocated before.⁸⁸ A simple system is that devised by the writer in 1938,³⁴ in which the gravis type is numbered VII, the mitis type O, and indeterminate and intermediate varieties from I to VI inclusive, depending on the number of "gravis" characters possessed by them. Source and virulence should be stated separately.

A discussion of the etiology of malignant diphtheria points out that the disease is only irregularly associated with

* In the areas surveyed, there were, on the average, about two to three times as many carriers of avirulent cultures as of virulent ones.

the so-called gravis type of organism and that, in the United States at least, during the past decade, many strains of the organism have been found to be wholly atoxigenic. Reasons are mentioned for suspecting that some unknown factor or factors, either within the organism itself (development of a capsule, for example) or extraneous to, but operating in conjunction with it (such as physiological characters of the host or certain strains of hemolytic streptococci, or both), may be of determining significance in malignant diphtheria.

A brief review of the prevalence and distribution, in various parts of the United States, of virulent and avirulent diphtheria bacilli having the cultural characters of the gravis, mitis, and indeterminate types is given. It is shown that the former type was of relatively infrequent occurrence in the country as a whole at the time the studies were made.

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Tropical Medicine Grants

For the 6 month period ending June 30, 1943, 12 grants amounting to \$43,680 were made by the American Foundation for Tropical Medicine, Inc., to 11 North American medical schools, a scientific journal, and the Army Medical Museum, it was reported by Dr. Jean A. Curran, executive director, at a meeting of the Executive Committee of the Board of Trustees in New York City on July 23.

These grants, made possible by contributions and pledges for the current year of \$66,600 by 21 American corporations, are being used to strengthen teaching and research programs in tropical medicine and parasitology at the various schools. The approved projects were selected by the medical committee among a number of applications.

Medical schools to receive grants during the period from April 1 to June 30 were: Cornell University Medical College, Duke University School of Medicine, University of Pennsylvania School of Medicine, and Stanford University Medical School. The *Journal of Parasitology* was also aided.

Schools of medicine to which grants

were made available during the first quarter of 1943 were: New York University College of Medicine, Tufts College Medical School, Tulane University School of Medicine, University of Manitoba Faculty of Medicine, University of Nebraska College of Medicine, and Yale University School of Medicine.

Companies which have made contributions or formal pledges of support include: Abbott Laboratories; American Cyanamid Company; Ciba Pharmaceutical Products Corp.; Firestone Plantations Company; General Foods Corporation; Hoffmann-La Roche, Inc.; The Lambert Company; Lederle Laboratories; Eli Lilly and Company; Merck & Co., Inc.; National Carbon Company; Parke, Davis and Company; E. R. Squibb & Sons; The Texas Company; United Fruit Company; William R. Warner & Company; Winthrop Chemical Company; Winthrop Products, Inc.; and John Wyeth & Brother.

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Use of Modern Laboratory Aids in the Investigation of a Typhoid Fever Outbreak

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IN one section of Oswego County, which is located in the north central part of New York State, typhoid fever has remained endemic throughout the past decade, 27 cases having been reported between 1931 and 1940. This section is a dairy farming region about 80 square miles in extent and, aside from 3 villages with average populations of 1,250, is entirely rural with a density of approximately 30 persons per square mile.

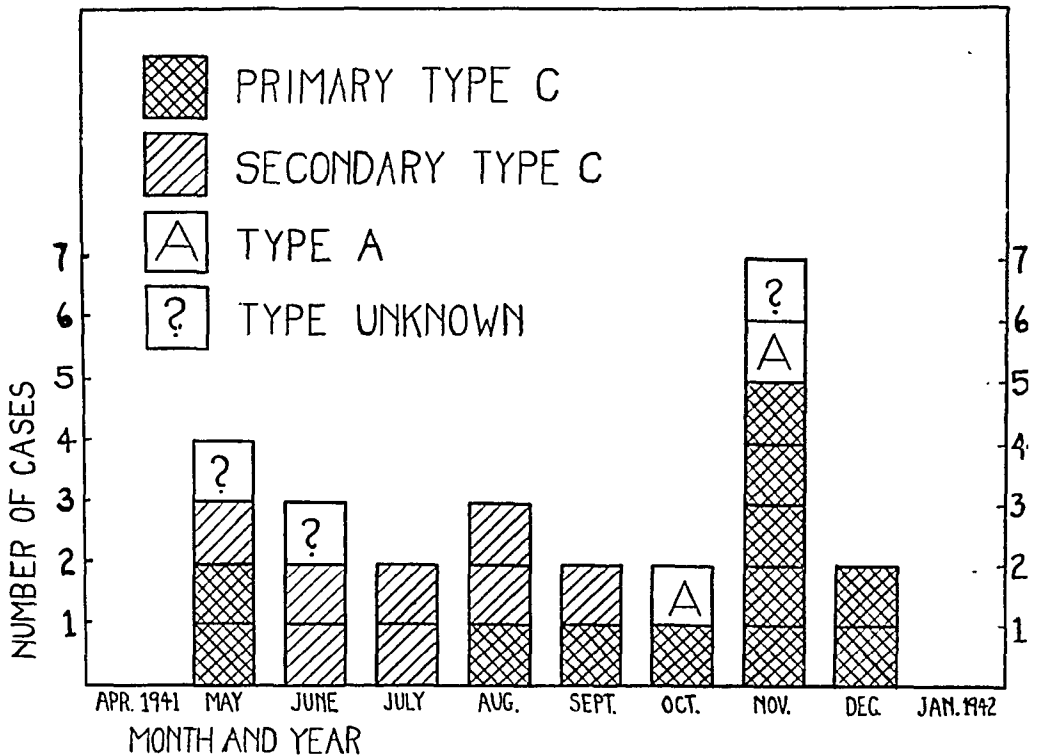
As the months of 1941 passed, it became apparent that even for this region an unusual number of cases of the disease were occurring (Chart 1). By the end of the year, 25 cases of typhoid fever had been reported, 8 of these presumably secondary familial infections. All the cases developed outside the limits of the 3 incorporated villages. There was no selection as to sex among the primary cases, 9 being male and 8 female, and the age distribution of the cases was approximately that of the population at large.

The earlier part of the investigation disclosed the apparent sources of 4 of the 17 primary cases. The first case was that of a 7 year old girl who became ill in May after she had spent week-ends during the previous 2 months at the home of her grandmother, E.O. The grandmother, who prepared food

for the child, had a history of typhoid fever and was found to be a chronic typhoid carrier. The other 3 cases were traced to a household in which M.W., a 59 year old housewife, did the cooking. A 51 year old man, related to M.W. by marriage, visited the latter's home before he developed typhoid fever in June. A neighbor's child, who also visited frequently in this home, became ill late in October. The third patient, the 2 year old granddaughter of M.W., fell ill a week after this. Although M.W. gave no history of typhoid fever, she did have recurrent attacks of colicky right upper quadrant pain and she was found to be a carrier.

Attempts to discover the source of infection in the remaining 13 primary cases proved fruitless at first. It was found that no single meal was eaten in common in more than 2 cases. Food served in the households of the cases was purchased from widely scattered sources. Milk and water used came from private supplies. In one restaurant patronized by 3 of the patients, fecal specimens submitted by the food handlers were negative for *Eberthella typhosa*. Blood sera from the food handlers revealed no Vi agglutination properties for *E. typhosa* when examined in the Division of Laboratories and Research of the New York State

CHART 1—Reported cases of typhoid fever in Oswego County according to months of onset and bacteriophage typing classified as primary and secondary familial cases



Department of Health by the method outlined by Coleman.¹

In the circumstances it was important at this stage of the investigation to determine, by bacteriophage typing, the minimum number of foci of infection involved. With this in view, typing of all available cultures, according to the method of Craigie and Yen,² was begun late in November. Ten cultures were obtained from primary cases and 2 from secondary cases in households in which a strain could no longer be isolated from the original patient. Ten of these strains were found to be type C. Type A strains were isolated from 2 of the 3 cases traced to the carrier, M.W., whose strain was also found to be type A. No culture was available from the third case associated with this carrier. The other carrier, E.O., was also found to be type A, but no culture could be

obtained from the case traced to her. In the ensuing 2 months, 2 more type C cases came to light. In another case discovered late in the course of the disease, the type was not determined because no typhoid organisms could be isolated.

The results of bacteriophage typing showed that the 2 type A carriers were not responsible for the major portion of the outbreak. The discovery of the type A cases, furthermore, confirmed the occurrence of a small outbreak unrelated to the larger mass of cases. Finally, the knowledge that at least 12 cases were type C made it likely that a single source of infection was responsible for the majority of the cases. The clue to this source was uncovered during the investigation of the last case developing in 1941.

F.E., an 18 year old boy, became ill with typhoid fever on December 18,

1941. Organisms isolated from this case belonged to type C. The boy had been employed in the preparation of mild American cheese at a small factory (hereinafter referred to simply as "the cheese factory") located at the fringe of the area in which the outbreak occurred. After questioning, it was learned that this patient had eaten curd several times at the cheese factory in the month before he became ill. He also stated that he had met several of the previous cases when they came to the cheese factory on business.

Reinvestigation of the other cases revealed that all but 2 of the primary type C cases, as well as the untyped case discovered during the course of the investigation, had eaten fresh curd obtained from the cheese factory during the 30 days prior to the onset of their disease. The 2 exceptions had had fresh cheese from the same source before they became ill. A typical story is that of R.M., a 22 year old dairy farmer. He had helped himself to curd from one of the vats on May 18, on one of the two occasions on which he delivered milk to the factory. He became ill about 8 days later. Taking the curd had been such a casual act that it had slipped his mind until he was questioned about it specifically. The only type C case without a definite history of having eaten curd or fresh cheese from the common source was a traveling salesman who died before this phase of the investigation was opened. This salesman, however, was known to have been fond of cheese and he had travelled through the area in which the outbreak occurred during the 6 weeks before the onset of his illness. Neither of the type A cases nor the third case stemming from the same type A carrier had taken any curd at all and none had any cheese that could be traced to the factory. The 11 surviving primary type C cases therefore definitely had curd or fresh cheese from

the factory whereas the type A cases as definitely did not have any from the same source.

With this evidence pointing to the products of the cheese factory as the medium of infection, it became necessary to determine whether the method of preparation of the cheese was compatible with continued survival of *E. typhosa*. Analysis of the process of manufacture revealed that the temperature of the milk or cheese was never raised above 106° F., and the acidity of the curd and fresh cheese was not materially altered from that of the original milk. The milk was delivered into vats directly from the farmers' milk cans. Rennin was stirred into the milk after the latter had been heated to 86° F. The temperature of the resulting coagulum or curd was then raised further to 106° and maintained at this level for 30 minutes. The rubbery mass remaining was finally ground and salted and placed in wooden molds. On the following day the fresh cheese was removed from the molds and allowed to stand at room temperature for about 2 weeks before it was shipped to a large factory in a neighboring county. There pasteurized American process cheese emerged as the final product. This description of the process shows that continued survival and even some growth of *E. typhosa* was possible in the curd and fresh cheese until aging caused acidification of the cheese.³

Even though the possibility of transmission of *E. typhosa* through the cheese products was demonstrated, this did not eliminate a chance association between eating the curd or cheese and the development of typhoid fever in the type C cases. Curd was a popular food locally and was to be obtained from three other cheese factories in the neighborhood as well as from the cheese factory implicated in the investigation. Nevertheless, none of these other fac-

tories was mentioned by the type C cases as the source of any cheese or curd they consumed. A small survey of 10 households in the region selected at random showed that members of only one household had eaten curd from the suspected cheese factory during the month preceding the date of questioning, contrasting sharply with the history of the type C cases. These facts strengthened the case against the cheese factory.

As a rough estimate, an average of 5 persons obtained curd from the factory daily, making a minimum of 1,200 person-exposures to possible infection over a period of 8 months. Yet only 12 cases of typhoid fever, whose probable source was the cheese factory, were reported during this period. With extensive consumption of curd, the question might be posed as to why an epidemic of far greater proportions did not occur. The chain of infection from carrier to case is a tenuous one at best. It is probable that contamination of the curd took place intermittently. Furthermore, two batches of cheese were prepared separately each day in each of two vats, so that the chance of contaminated milk reaching any given batch was only 1 in 4. Finally, it was local household practice to "can" the curd; i.e., place it in airtight jars, for periods of 4 to 8 weeks, in order to mellow it. This reduced the danger of infection to a minimum. In regard to fresh cheese, very little of this was sold at the factory, almost the entire output of the factory going into the manufacture of American process cheese.

On the evidence at hand, the following restrictions were placed upon the cheese factory with the concurrence of the owner: The sale of curd and of fresh cheese less than 6 weeks of age was to be stopped. Strict orders were to be issued to the employees of the cheese factory forbidding the consumption of curd in the factory and pro-

hibiting removal of any curd from the factory by employees or by others having business in the plant.

With these restrictions in force, a search was undertaken for a typhoid carrier in the factory. A series of 3 fecal specimens were examined from each of 9 of 10 persons employed in the factory at any time during 1941, as well as from the owner's wife and child who entered the factory almost daily. The 10th person, who could not be reached, was a 19 year old boy who had worked at the factory for only a few days. In addition, Vi antibody studies were performed on blood specimens obtained from the owner and the 2 steadily employed workers. The results of all these examinations were negative. A sanitary survey of the water supply serving the factory evidenced no permanent source of human pollution within dangerous distances. Bacteriological examination of the water showed no coliform organisms. It was felt that the supply should be of safe sanitary quality. In view of these negative findings, contamination of the curd at the factory was therefore extremely unlikely.

The search for a typhoid carrier among the dairy farmers supplying the cheese factory concluded the investigation. Review of the factory records revealed that 242 farmers had shipped milk to the factory at some time during the last 9 months of 1941. Of these, 64 had delivered milk regularly during the entire period. Prominent among these 64 was a 57 year old farm housewife, N.M., who had been under suspicion on a previous occasion as a possible typhoid carrier.

N.M., whose chores included milking the cows, first came under attention in 1935 when 7 persons on a neighboring farm developed typhoid fever. She had had typhoid in 1918, following which she had suffered for 6 months from attacks of epigastric pain radiating to

the right shoulder. The first fecal specimen obtained from her in 1935 revealed the presence of *E. typhosa*, but 9 subsequent specimens were negative. Milk from her farm was first delivered to the cheese factory in October and November, 1940. No further deliveries were made until April 1, 1941, 5 weeks before the onset of the first case traced to the cheese factory. Because of this epidemiological evidence, N.M. was strongly suspected as the source of the 1941 outbreak. A blood specimen secured early in 1942 showing the presence of Vi antibody in a titer of 1:80 further strengthened this suspicion. However, 18 fecal specimens submitted by her between February 17 and August 31, 1942, were negative for typhoid bacilli, despite the fact that 9 specimens were authenticated by the use of lycopodium spore capsules prior to submission of the specimens and liquid specimens were obtained by the administration of magnesium sulfate. Finally she was hospitalized. A series of 3 biliary and fecal specimens secured on successive days, each time following the injection of magnesium sulfate via duodenal tube, contained *E. typhosa*. The type of the organisms could not be determined with the bacteriophage preparations available but it was definitely not type C. Therefore, despite the overwhelming epidemiological evidence, N.M. was not the source of this outbreak. While N.M.'s status was being settled, 20 other dairy farmers were examined with negative results.

For the first 8 months of 1942, Oswego County was free of typhoid fever. In September, 2 new type C cases were reported. Both of these had secured curd from the factory during the month before the onset of their illness. Apparently the constant turnover in help at the factory had made it difficult for the owner to maintain the restrictions upon which he had agreed.

Another case of typhoid fever, occur-

ring in one of the nearby villages in the month of September, 1942, led to the discovery of the carrier presumably responsible for the outbreak. This 30 year old patient, whose organisms were resistant to typing, had never eaten curd and he disliked cheese. However, he had spent 3 weeks on the farm of one of the 64 dairy farmers, G.W., 47 years of age, who had delivered milk to the cheese factory during the entire period of the outbreak. This visit to the farm had terminated 6 weeks before the onset of the patient's illness, but the patient had paid another short visit 3 weeks later. Five fecal specimens were submitted by the dairy farmer and all contained typhoid bacilli which fell into type C. G.W. had no history of typhoid fever and no complaints suggestive of cholecystic disease. The absence of a history of the ingestion by the carrier of any products of the cheese factory eliminated the possibility of a passive carrier state. Milk deliveries to the cheese factory from his farm had begun in May, 1940. No further cases of typhoid fever have been traced to the cheese factory since September, 1942, a period of 11 months at the time of writing. Milk deliveries to the cheese factory have been stopped from the farms of the 2 carriers.

DISCUSSION

Although a number of epidemics of typhoid fever due to contaminated cheese have been reported,^{4, 5} the present outbreak has several features of unusual interest. In the first place, the main body of cases were spread over a period of 8 months, with 2 more cases 9 months later, indicating repeated contamination of the milk supply of the cheese factory. In the second place, the majority of the cases became infected by eating small amounts of curd at the factory, usually when they entered the factory on business. Although the curd was used extensively in the

neighborhood, very little of it was consumed in a fresh state away from the factory. Finally, 4 cases occurring contemporaneously with those caused by ingestion of cheese or curd were found to be unrelated to the latter.

The use of more recently developed laboratory procedures provided valuable assistance during the course of the investigation. Bacteriophage typing confirmed the existence of two components unrelated to the main outbreak. It ruled out the type A typhoid carriers as the cause of the outbreak and later, when 2 carriers were found among the dairy farmers supplying the cheese factory, typing definitely eliminated one of them as the ultimate source of the outbreak and indicated the probable responsibility of the other. The utilization of Vi antibody studies permitted a more certain exclusion of the food handlers in the restaurant and cheese factory as typhoid carriers. The presence of Vi antibody in the blood from N.M. encouraged continued search for typhoid bacilli in her fecal specimens, despite the fact that a total of 18 specimens, several authenticated by the use of lycopodium spores, were negative. The combined Vi antibody studies and bacteriophage typing relegated N.M. to her proper place as an incidental carrier unrelated to the causation of the outbreak.

SUMMARY AND CONCLUSIONS

1. An outbreak of 27 cases of typhoid fever is described, 23 of which were probably due to the ingestion of curd or fresh cheese at a local factory or were secondary to such cases.

The cases occurred over a period of 17 months.

2. Bacteriophage typing separated the type C cases, due to the contaminated curd and cheese, from type A cases, traced to food prepared by 2 type A typhoid carriers.

3. Two typhoid carriers were found among the dairy farmers supplying the cheese factory. Typing showed one to be type C and eliminated the other as the possible source of the outbreak; despite the fact that epidemiological evidence alone pointed more forcefully to the latter as the carrier responsible for the outbreak.

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NOTE: We wish to express our appreciation to the following members of the Staff of the New York State Department of Health: Dr. Edward B. Bukowski, Acting District State Health Officer, for his supervision and encouragement throughout the investigation and for his own investigation of the first case of typhoid fever to occur in 1941, resulting in the discovery of the typhoid carrier, E.O., as the source of the case; Marion B. Coleman of the Division of Laboratories and Research for the performance of the Vi antibody studies and bacteriophage typing, the results of which are given in the body of the paper; and Herbert H. Wagenhals, District Sanitary Engineer, for the sanitary survey of the water supply serving the cheese factory.

Epidemic Diarrhea of the New-born: A Report of Two Outbreaks

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TWO outbreaks of diarrhea of new-born infants occurred in a hospital in Rochester, N. Y., within a 4 month period. In the first outbreak the disease seemed to be transmitted chiefly by contaminated rubber nipples and formulae and to a lesser extent by indirect contact; in the second it was apparently transmitted by faulty maternal breast technic. Both outbreaks promptly came to an end following control measures based upon studies of the mode of transmission.

METHODS OF INVESTIGATION

The investigation was conducted by representatives of the Rochester Health Bureau and the New York State Department of Health, with the coöperation of the hospital staff. Data for all infants, sick and well, were transcribed from hospital records to epidemiological record forms upon which were entered name, address, date of birth, sex, color, nursery or nurseries occupied, outcome, and daily observations of weight, body temperature, feeding, stools, special procedures, and unusual occurrences. To provide a base-line of normalcy, these records were obtained for pre- and post-epidemic as well as the epidemic periods. The methods employed by the hospital for recognition of cases, isolation, general nursery technic, and formula preparation were

studied in detail, and samples of feces and of nipples, bottles, and formula were subjected to bacteriological examination.

FIRST OUTBREAK: APRIL–MAY, 1942

An investigation was begun May 1, when through following up a death certificate it was discovered that a number of cases of diarrhea, some fatal, had occurred among infants in the hospital during the latter part of April.

Nature of the illness—Severe cases were characterized by frequent loose greenish stools, reddening of the buttocks, mild fever, dehydration, and loss of weight. This was the type of case generally conceded by hospital staff physicians to represent clear-cut diarrhea of the new-born. There were 28 such cases, in which group all of the 3 fatalities occurred. One death was of an infant with a cephalic deformity compatible with life, one in an infant with cerebral hemorrhage, and one in an infant born prematurely but of normal birth weight.

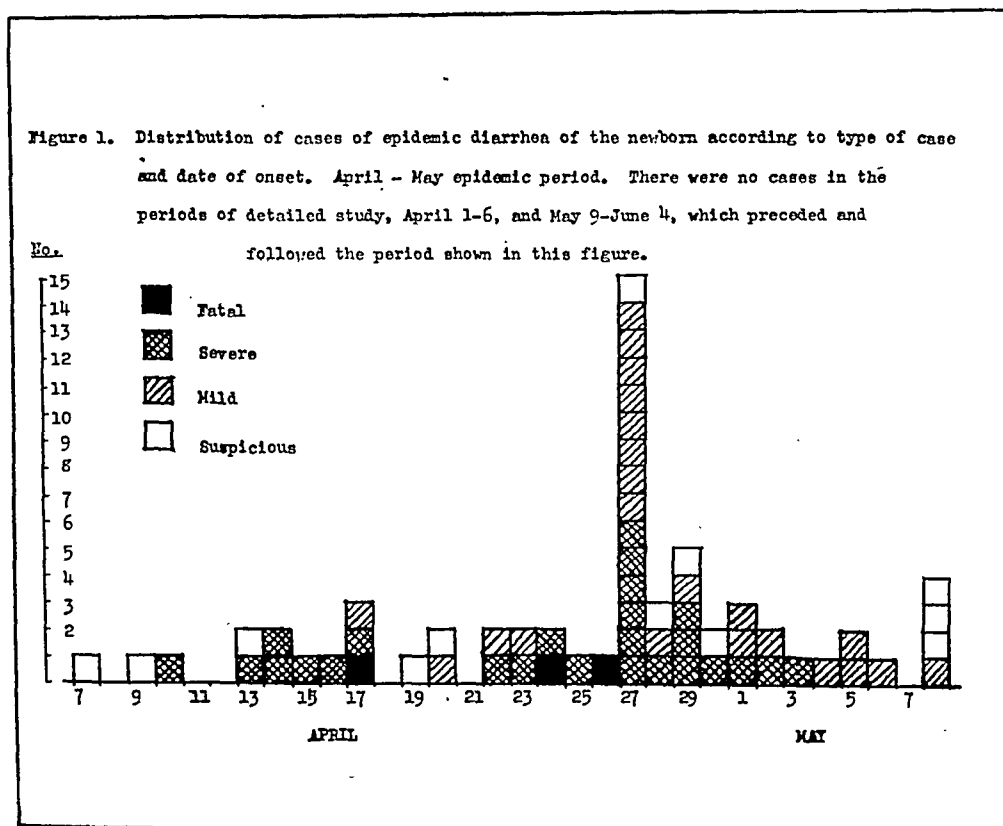
Twenty-two infants which presented signs and symptoms only slightly less marked were considered by the investigators to be definite cases also, making a total of 50 in this outbreak. Twelve others with still milder signs were classified as suspicious cases, and an additional 21 who showed only slight

deviations from normal, such as a few green stools or a temporary increase in number, were classified as probably normal. One hundred and thirty-five infants were considered to be normal. Thus, as in many other diseases, there was a gradation from normal to very severe which, in the absence of a means of laboratory confirmation, presented a very difficult problem in diagnosis.

Diagnosis—From the epidemiological standpoint it made little difference whether one diagnosed as epidemic diarrhea of the new-born only the 28 severe cases, or included the 22 definite but milder cases, since the distribution of the two types was similar with respect to date of onset, nursery of occurrence, feeding history, etc. From the standpoint of control, however, the diagnosis and segregation of the milder cases was of great importance since they also were presumably infectious. This

may have been true of the suspicious cases as well. As an aid in diagnosis a rigid classification was set up and adhered to. The essence of it was that if an infant had more than one loose stool in one day he was considered as suspicious, and if loose stools persisted for two or more days he was classified as a case.

Chronology—Figure 1 shows the distribution of severe, mild, and suspicious cases according to date of onset. The probably normal infants are not shown because they present no chronological relationship to the epidemic and are considered to represent only simple biologic variations from the norm. The outbreak began about April 7 and ended May 8. A marked peak occurred on April 27 when 14 definite cases occurred. The distribution of suspicious cases does not follow closely the other two types except that



their occurrence was limited to the epidemic period. Subsequent tables omit suspicious cases and group the severe and mild cases together.

H2-B 5 days, and in H3 5 days after these nurseries were opened.

Relationship to type of feeding—It was customary in this hospital to give

TABLE 1
Distribution of Infants and Cases of Diarrhea, According to Nursery

| Nursery | Date Opened to Admissions | Date Closed to Admissions | No. of Infants Admitted | Number Ill | Per cent Ill |
|----------|------------------------------|------------------------------|----------------------------|---------------|-----------------|
| H1-A | Prior to Apr. 1 | Apr. 24 | 33 | 12 | 36.4 |
| H2-A | Prior to Apr. 1 | Apr. 28 | 121 | 30 | 24.8 |
| H2-B | Apr. 27 | May 1 | 9 | 3 | 33.3 |
| H3 | May 1 | May 4 | 15 | 5 | 33.3 |
| H2-Prem. | May 5 | * | 5 | 0 | .... |
| H1-B | May 5 | * | 58 | 0 | .... |
| H2-C | May 11 | * | 85 | 0 | .... |

* Still open June 4

Nurseries affected—Table 1 shows the distribution of infants and cases according to nursery. The number of infants for nurseries H1-A and H2-A is made up of those infants in such nurseries on April 1 and those admitted subsequently. A few infants who died or left the hospital shortly after birth are excluded from the figures. Fifty cases of diarrhea occurred among 178 infants at risk April 1 to May 5, a rate of 28.1 per cent. The similar attack rates in nurseries H1-A and H2-A suggests that the factor or factors producing the illness were operating with approximately equal force in each. The first definite case occurred in H2-A on April 10 and in H1-A on April 14. The chronological distribution of cases was approximately the same in each of these nurseries and in each instance the peak incidence fell on April 27. The first case occurred in

routinely only 5 per cent lactose for the first 2 or 3 days of life; subsequently most infants were put to breast and given supplementary feedings of whole or evaporated milk formula. Thus every infant had some exposure to the possibility of infection by contaminated nipples, bottles, and lactose or formula. A small number were never put to breast, and a very small number never received any formula.

Table 2 shows the attack rate according to type of feeding for 177 infants for whom data are available at risk during the epidemic period. Although the numbers on which these rates are based are small, there appears to be a definite trend toward increased risk of attack as the amount of artificial feeding increases and breast feeding decreases. There is no statistically significant difference between evaporated and whole milk, either alone or

TABLE 2
*Attack Rates According to Type of Feeding
April-May Outbreak*

| Type of Feeding | No. of Infants | No. Ill | Per cent Ill |
|-------------------------|----------------|---------|--------------|
| Breast milk and lactose | 9 | 1 | 11.1 |
| " " " whole milk | 60 | 11 | 18.3 |
| " " " evap. milk | 75 | 19 | 25.3 |
| Evaporated milk only | 17 | 8 | 47.0 |
| Whole milk only | 10 | 5 | 50.0 |
| Other (dry milk, etc.) | 6 | 5 | 83.3 |
| Totals | 177 | 49 | 27.7 |

in conjunction with breast milk. Grouping the types of feeding it is found that, whereas only 21.5 per cent of 144 infants receiving breast milk and supplement became ill, 54.5 per cent of the 33 receiving formula alone became ill. This difference, which is statistically significant, emphasizes the association between risk of attack and type of feeding. Similarly, only 16, or 11.1 per cent, of infants receiving some breast feeding developed severe cases while 12, or 36.4 per cent, of those receiving only formula became severe cases. On this evidence alone, however, it is impossible to state whether breast milk confers a protective effect or whether formula carries increased risk of infection.

TABLE 3

Attack Rates According to Birth Weight

| <i>Birth Weight *</i> | <i>No. of Infants</i> | <i>No. Ill</i> | <i>Per cent Ill</i> |
|-----------------------|-----------------------|----------------|---------------------|
| Less than 4.75 lb. | 2 | 0 | .. |
| 5.25 | 7 | 4 | 57 |
| 6.25 | 30 | 5 | 17 |
| 7.25 | 65 | 13 | 20 |
| 8.25 | 58 | 22 | 38 |
| 9.25 | 14 | 6 | 43 |
| More than 9.75 | 2 | 0 | .. |
| Totals | 178 | 50 | 28.1 |

* Grouped to nearest indicated weight

Relationship to birth weight—Table 3 shows that in this outbreak overweight as well as underweight infants apparently were somewhat more susceptible than those of normal birth weight.

Sex—There were 28 cases in males, 22 in females. All 3 deaths occurred in males.

Age—In the absence of knowledge of the date of effective exposure it is impossible to fix the incubation period. Table 4 shows the distribution of cases according to the day following birth in which first symptoms occurred. The median case fell on the 5th day. The most interesting feature of this table is the indication that the incubation period may be as short as 24 hours.

The brevity of this period suggests an infectious or toxic agent received by ingestion, paralleling the experience with gastroenteritis in older children and adults.

TABLE 4

Distribution of Cases by Day of Onset

| <i>Onset: Days after Birth</i> | <i>No. of Cases</i> |
|--------------------------------|---------------------|
| 1 | 3 |
| 2 | 3 |
| 3 | 5 |
| 4 | 10 |
| 5 | 6 |
| 6 | 7 |
| 7 | 7 |
| 8 | 4 |
| 9 | 1 |
| 10 and over | 4 |
| Total | 50 |

Mode of transmission—The medical histories of the mothers and the causes of illness among nurses absent from duty or cared for by the institutional medical service were reviewed without gaining any information as to the manner in which the agent responsible for the outbreak was originally introduced.

There was little opportunity for direct contact, the bassinets being kept in cubicles with intervening partitions 2 feet in height. Breast-fed infants were conveyed to mothers in a large carrier, a partition 10 inches high separating the infants. Although in these circumstances respiratory spray from one infant might reach another, none presented any respiratory illnesses which would forcibly eject such a spray for a great distance. Transmission of infection by equipment did not seem likely since individual tubs, toilet articles, and thermometers were used, infants were diapered in their own bassinets, and a clean drape was placed on the scale before weighing each infant.

Some degree of transmission through breaks in nursing technic seemed quite possible although the evidence was indirect. In the previous year the hospital averaged about 100 deliveries

per month, but the phenomenal rise in the birth rate in 1942 increased this rate to more than 150 per month. Coincidental with the increase there was difficulty in securing sufficient and well trained nurses. Prior to and in the early weeks of the epidemic the nurseries were understaffed, it being reported that on occasion a single nurse might be responsible for the care of 30 or more infants for a period of hours, and it was indeed observed that one nurse would frequently be caring for as many as 20 infants at one time. The ratios of infants to nurses far exceeded minimum standards. In the large nursery, H2, bassinets were in two adjoining rooms, yet a sink was provided in only one. In the several nurseries nurses were occasionally observed to wash their hands only perfunctorily after diapering an infant and to use cold or tepid water and very little soap. Until May 2 or 3 the routine provided for diapering infants before feeding, thus increasing the risk of transmission of infection if a break in technic occurred.

As reported previously,¹ rubber nipples have been suspected as a vehicle of infection. In this hospital they were washed in the nursery after use, placed in a vessel of boiling water for a period of 3 to 15 minutes, removed with sterile forceps, and placed in a sterile covered jar until the time of the next feeding when they were applied to the bottles by hand by the nursery nurse. No precautions were taken to insure complete submersion of nipples in the water. The period of boiling seemed rather short in view of a finding some weeks previously by the obstetrical supervising nurse that satisfactory bacteriological results were not obtained with less than a 20 minute period.

The possibility of transmission through contaminated formula¹ was seriously considered in view of the

nearly simultaneous onset of the epidemic in the two nurseries operating in April, the explosive occurrence of cases on April 27, and the similar course of the epidemic in both nurseries. Formula was prepared in a room which was well equipped but obviously too small for the purpose. Bottles were boiled for 15 minutes before being filled. Whole milk formula, water and 5 per cent lactose solution, were reported to be boiled prior to filling bottles. Evaporated milk was boiled in the can, added to Karo and boiled water in a graduate, and the mixture poured into bottles. Powdered milk formulae were made with boiled water but the resultant mixture was not boiled. After the nursing bottles were filled a boiled rubber cap was applied. Some were sent to the nurseries to be refrigerated until needed and some, together with additional formula held in reserve in quart bottles, were stored in the formula room refrigerator. Failure to defrost often and frequent opening of the refrigerators cast some doubt as to the adequacy of refrigeration. These preparations were carried out by one or more student dietitians and a maid, under supervision of the chief dietitian. Other demands on the time of the latter were so great that close supervision was not maintained.

Nipples and formula which were ready for use by infants were secured at random under sterile precautions, and examined by the Rochester Health Bureau Laboratories and the Division of Laboratories and Research, New York State Department of Health. Total bacteria counts were obtained for nipples by swabbing outer and inner surfaces with a sterile swab moistened in buffered dilution water, reimmersing the swab in 2 ml. of the water and then plating out 1 ml. Counts were obtained for formulae by the standard plate count method for milk examination.

TABLE 5

Total Bacteria Counts Obtained upon Examination of Rubber Nipples and of Formula

| Date Prepared | Nipples: Total Bacteria per Entire Surface | | | | Formula: Total Bacteria per ml. | | | |
|---------------|--|----------|--------|----------|---------------------------------|---------|--------|---------|
| | No. of Samples | Maximum | Median | Minimum | No. of Samples | Maximum | Median | Minimum |
| April 30 | | | | | 7 | 180 | 60 | 20 |
| May 1 | 2 | >160,000 | .... | >160,000 | 1 | 10 | .. | 10 |
| 2 | 20 | >160,000 | 6,500 | 60 | 0 | .. | .. | .. |
| 4 | 19 | >160,000 | 7,000 | 28 | 2 | 150 | .. | 10 |
| 5 | 7 | 16 | 4 | <4 | 5 | 470,000 | 70 | 10 |
| 6 | 14 | 8 | 0 | 0 | 15 | 550 | 80 | 10 |
| 7 | 1 | 2 | .. | 2 | 2 | 12,000 | .. | 2,000 |
| 10 | 5 | 6 | 0 | 0 | 7 | 540,000 | 100 | 0 |
| 11 | 4 | 76 | 0 | 0 | 4 | 100 | 0 | 0 |
| 12 | 6 | 4,300 | 42 | 0 | 6 | 30,000 | 0 | 0 |
| 14 | 2 | 6 | .. | 2 | 2 | 2 | .. | 0 |
| 17 | 4 | 4 | 2 | 0 | 4 | 0 | 0 | 0 |
| 21 | 5 | 4 | 2 | 0 | 5 | 500 | 0 | 0 |
| 22 | 2 | 4 | .. | 0 | 2 | 300 | .. | 200 |
| 24 | 2 | 0 | .. | 0 | 2 | 200 | .. | 0 |
| 25 | 1 | 2 | .. | 2 | 1 | 0 | .. | 0 |
| 28 | 3 | 4 | 0 | 0 | 3 | 100 | 1 | 0 |
| Totals | 97 | | | | 68 | | | |

Table 5 shows the number of samples examined and the maximum, median, and minimum counts for the indicated day. Caution must be used in reading the results for formula examination; on May 5 the count next highest to the one of 470,000 was only 200; on May 10 the count next highest to the one of 540,000 was only 200, and on May 12 the count next highest to the one of 30,000 was only 600. A definite reduction in the counts for nipples is observed beginning with reorganization of the formula room May 5. Improvement in formula counts is not so noticeable until May 11. Organisms of the coliform group, indicating contamination presumably of fecal origin, were found on April 30 in 2 samples of formula, May 5 in 1 and May 12 in 1. They were found May 1 on 2 nipples, May 4 on 7, and May 12 on 3.

Diagnostic laboratory findings—53 fecal specimens from 17 sick infants were submitted to the Division of Laboratories and Research for examination. None of the bacillary incitants of enteric disease nor any other microorganisms of recognized diagnostic significance were found. Marion

B. Coleman of the Division of Laboratories and Research, New York State Department of Health, kindly repeated the work described in a previous communication.¹ Two or more baby Swiss mice were inoculated intraperitoneally with ether-treated portions of each specimen and in addition single fecal specimens from each of 10 infants in a second hospital in Rochester were similarly examined as controls. The results are summarized in Table 6.

Grouping the severe and mild cases, it is found that 39 per cent of inoculated mice died, and grouping the normal controls, only 11 per cent died. Or, considering infants whose feces contained some principle capable of killing mice, 70 per cent of the severely ill possessed this property; while 53 per cent of the severe and mild cases together, and only 27 per cent of the control cases had this property. These data have been so presented as to minimize the apparent difference between sick and well infants and taken as they stand may not appear conclusive. However, taking into account the factors mentioned in the footnotes to Table 6, particularly the prolonged incubation period in fatal instances in

TABLE 6

*Lethal Effect upon Baby Swiss Mice of Injection of Ether-treated Suspension
of Feces from Infants*

| <i>Diagnosis in Infants</i> | <i>No. of Infants</i> | <i>No. of Fecal Spec.</i> | <i>No. of Mice Inoculated</i> | <i>Per cent of Mice Dying</i> | <i>Per cent of Infants Whose Feces Caused Death of Mice</i> |
|---------------------------------|---------------------------|-------------------------------|-----------------------------------|-----------------------------------|---|
| Hospital A | | | | | |
| Severe case | 10 | 36 | 80 | 42 | 70 |
| Mild case | 7 | 17 | 30 | 27 * | 28 |
| Normal | 1 | 4 | 8 | .. | .. |
| Hospital B | | | | | |
| Normal | 10 | 10 | 20 | 15 † | 30 |
| Totals | 28 | 67 | 138 | 33 | 43 |

* Of the 8 deaths upon which this percentage is based, 7 occurred among mice inoculated with specimens from a single infant.

† The 3 deaths upon which this percentage is based occurred 6, 7, and 15 days following inoculation, in comparison with a usual period of 1-4 days in mice dying in the other groups. In each instance a mouse inoculated with a portion of the same specimen survived.

NOTE: 4 infants in the "severe" group were receiving sulfaguanidine. For 2 of these all mice survived; for 2 others 13 of 28 mice died.

the control group, it appears justifiable to interpret these findings as showing that some agent lethal for mice is frequently present in feces of infants suffering from diarrhea of the new-born. Unfortunately, this agent has not been identified. The relatively infrequent association of this effect with feces of mildly ill infants may have been due to improper diagnosis or a lesser concentration of the agent in the feces, or both.

Control measures—Prior to the investigation, control measures had consisted of instituting gown technic on April 28, isolating very ill infants by transfer to the pediatric nursery, vacating and washing nursery H1-A, closing H2-A to admissions, and establishing H2-B for new admissions on the dates indicated in Table 1. Mild and suspicious cases were not usually recognized and isolated, and since there was no one person responsible for detecting and ordering isolation of cases it was not uncommon for a day or two to elapse between onset and isolation of a recognized case. The measures described did not seem conspicuously successful, although one cannot state with certainty what the actual outcome would have been had no additional measures been imposed.

On May 1 arrangements were made for the detection of ill and suspiciously ill infants according to the criteria described in the section on diagnosis. Being an attempt to determine infectiousness and based primarily upon feces rather than clinical condition, this standard resulted in the classification of some infants as definite or suspicious cases at a time when their general condition seemed satisfactory to the clinicians. Considerable friendly dispute with clinicians arose thereby, but the standard was rigidly adhered to and all such infants were required to be isolated.

Specific recommendations were made for preparation of nipples and formula in the central formula room. Formula for a 24 hour period was to be made up and subsequently boiled before filling autoclaved bottles; nipples boiled 30 minutes while completely submerged were to be applied to the bottles in a sterile field using aseptic technic; nipples were to be covered with an autoclaved metal cap; and the whole was to be immediately refrigerated.

Assuming that these recommendations would be carried out immediately, a new nursery, H3, was opened May 1 to receive newly-born infants who would have had no contact with others

and who would receive sterile food and drink. Well infants in other nurseries were to remain where they were unless they became ill and required transfer to the pediatric nursery, or until they were discharged home. Establishing H3 was not a successful venture; one-third of the 15 infants admitted within the next 5 days became ill, beginning May 4. The manner in which the disease was introduced is not known, but from a study of Table 5, it would seem reasonable to attribute it to failure to sterilize nipples, and possibly formula, until May 5. On the latter date the formula room was placed in charge of a nurse who taught bacteriology, with immediate improvement in bacteriological results. Under her direction the new procedure was routinized and was subsequently returned to the dietitians. Other control measures provided that infants be diapered after rather than prior to feeding, and placed emphasis on careful handwashing. A larger nursing staff and rearrangement of one of the nurseries were urged.

Having attained satisfactory technic in the formula room, new nurseries, H1-B and H2-Prem. were opened May 5 (see Table 1). No cases occurred among infants born on this date or thereafter for a period of daily study extending through June 4. The cessation of the epidemic following these measures may have been due to prompt recognition and isolation of cases, or improvement in nursing technic, or proper sterilization of nipples and formula, or some combination thereof.

SECOND OUTBREAK: JULY, 1942

After June 4 daily observations were discontinued in the expectation that satisfactory conditions would continue, but on July 22 the hospital reported the recent occurrence of a number of cases of diarrhea. An investigation undertaken in the manner previously described revealed that the nurseries

had remained free of diarrhea from June 4 until July 8 and 9 when 3 rather mild cases occurred in H1 nursery. These were not isolated but the outbreak subsided spontaneously. On July 17 an infant in the H1 nursery developed loose stools and was not isolated but, following this, cases began to appear as shown in Table 7.

TABLE 7

Distribution of Cases of Diarrhea among New-born Infants According to Date of Onset and Nursery of Occurrence

| Date | H1 | H2 | H3 | Total |
|------------|--------|----|--------|-------|
| July 10-16 | .. | .. | Closed | 0 |
| 17 | 1 | .. | " | 1 |
| 18 | .. | .. | " | 0 |
| 19 | .. | 1 | " | 1 |
| 20 | 4 | 2 | " | 6 |
| 21 | .. | 2 | " | 2 |
| 22 | .. | 5 | .. | 5 |
| 23 | .. | 1 | .. | 1 |
| 24 | .. | .. | .. | 0 |
| 25 | Closed | .. | 3 | 3 |
| 26 | " | .. | .. | 0 |
| 27 | .. | .. | Closed | 0 |
| 28 | .. | .. | " | 0 |
| 29 | 1 | .. | " | 1 |
| 30 | .. | .. | " | 0 |
| 31 | .. | .. | " | 0 |
| Aug. 1 | .. | .. | " | 0 |
| 2 | .. | .. | " | 0 |
| 3 | .. | 1 | " | 1 |
| 4-24 | .. | .. | " | 0 |
| Totals | 6 | 12 | 3 | 21 |

The majority of these cases were quite mild, resembling those classified as mild in the April-May outbreak, and there were no deaths. None of the bacillary incitants of enteric disease or any other microorganisms of recognized diagnostic significance were isolated from 11 fecal specimens from 6 sick infants. Twenty-two mice were injected as described previously. One mouse inoculated with material from the most severe case died 8 days later; the others remained well and showed no abnormalities when chloroformed and autopsied 3 or 4 weeks later.

The rather explosive occurrence of cases July 20, 21, and 22, and the similar attack rates of 24 per cent in H1, and 32 per cent in H2 nurseries suggested a common source of infection, probably nipples or formula. In

partial support of this hypothesis it was found that of 8 nipples prepared July 22, one showed a total count of more than 160,000 and others counts of 56,000, 8,000, and 4,400. These were chiefly spore-forming organisms, probably *Bacillus subtilis*. Of 8 samples of formula, only one had a high count, 29,000; this and two other samples yielded *B. subtilis*. Perhaps as a result of the attention focused on the formula room, results were uniformly good July 23 and after.

When feeding histories were analyzed, however, it was difficult to support the hypothesis of spread by contaminated nipples and formula. Table 8 shows attack rates according to feeding history for infants in the hospital July 18-23. Section A of the table classifies infants according to the type of feeding beginning from birth and indicates that in this outbreak breast feeding carried a great risk of attack. This finding was so contrary to what was expected that it was thought possible a number of infants classified in Section A as breast-fed might have gone to breast for only a few days in the preëpidemic period and subsequently received formula as a supplement or alone during the period beginning with the onset of the first case on July 17. Section B of Table 8 classifies infants according to the type of feeding in the

period July 17-20. This analysis brought out even more strikingly the risk of breast feeding and the safety of artificial feeding under the conditions prevailing, and directed attention to breast-feeding technic.

It was found that under the stress of a shortage of nurses the practice had developed in each of the two nurseries of providing a single breast tray containing a vessel of 4 per cent boric acid and one of cotton pledgets. Infants were diapered, etc., prior to being taken to the mother for breast feeding. The nurses would then dip cotton pledgets in the boric acid and with the fingers squeeze the excess fluid back into the vessel. Infants were carried to the mothers, the pledgets were used to cleanse the nipples and the infants were then put to breast. The cotton pledgets as such did not fall under suspicion because a fresh supply was received daily from the carefully controlled central autoclave. There remained the possibility that a nurse might contaminate the boric acid solution with her fingers and if the organisms survived for even a short time contamination could be transmitted to the nipples of a number of mothers and thus to their infants.

F. Wellington Gilcreas of the Division of Laboratories and Research, New York State Department of Health,

TABLE 8
Attack Rates According to Type of Feeding History—July Outbreak
A. According to Feeding from Birth

| Type of Feeding | No. of Infants | No. Ill | Per cent Ill |
|-------------------------|----------------|---------|--------------|
| Breast milk and lactose | 14 | 9 | 64 |
| " " " formula | 24 | 9 | 38 |
| Formula alone | 8 | 0 | . |
| Totals | 46 | 18 | 39 |

B. According to Feeding from July 17

| | | | |
|-------------------|----|----|-----|
| Breast milk alone | 2 | 2 | 100 |
| " " and lactose | 13 | 9 | 69 |
| " " and formula | 15 | 7 | 47 |
| Formula alone | 16 | 0 | .. |
| Totals | 46 | 18 | 39 |

TABLE 9

*Fate of Organisms Inoculated into 4 Per cent Boric Acid and Allowed to
Remain There for Indicated Time*

| Time in Minutes | Fraction of Original Culture | Average Count per ml. in Suspension | | |
|-----------------------|---------------------------------|-------------------------------------|------------------|--------------------|
| | | <i>E. Coli</i> | <i>S. aureus</i> | <i>S. faecalis</i> |
| <1 | 1/1,000 | 180 | 0 | TMC* |
| | 1/100,000 | 1 | 0 | 1,700 |
| 5 | 1/1,000 | 50 | 0 | TMC |
| | 1/100,000 | 1 | 0 | 1,400 |
| 15 | 1/1,000 | 27 | 0 | TMC |
| | 1/100,000 | 0 | 0 | 1,400 |
| 45 | 1/1,000 | 7 | 0 | TMC |
| | 1/100,000 | 0 | 0 | 1,300 |
| 75 | 1/1,000 | 8 | 0 | TMC |
| | 1/100,000 | 0 | 0 | 2,300 |

* TMC = too many to count

prepared suspensions of *Escherichia coli*, *Staphylococcus aureus*, and *Streptococcus faecalis*, and inoculated them into 4 per cent boric acid and into distilled water. At the intervals indicated in Table 9, portions were removed and the average count per ml. determined. With both 1:1,000 and 1:100,000 dilutions there were too many colonies to count in case of all three cultures which were inoculated into distilled water. In 4 per cent boric acid *S. aureus* failed entirely to survive and only a few organisms of the coliform group survived, but *S. faecalis* was not affected. It is not held that *S. faecalis* was the etiologic agent in this outbreak but it does seem reasonable to assume that some type of organism capable of surviving for some time in 4 per cent boric acid was at fault.

As in the previous outbreak sick infants were promptly isolated in a separate nursery (H3). By July 25 the probable mode of transmission was sufficiently appreciated to lead to the recommendation that breast technic be revised. Effective control seems to have been attained shortly thereafter by the use of forceps to handle the pledget, although one case occurred in a formula-fed infant July 29, and one in a breast-fed infant August 3. The technic was later revised to provide for

individual pledgets on wooden applicators. No further cases were recognized during a period of close observation concluded August 24.

In explanation of the approximately simultaneous outbreak in the two nurseries is the fact that shifts of nurses occurred at a time and under conditions which would permit the development of cases by the spread of infectious material from the case developing July 17. The greater incidence of cases among those receiving breast milk and lactose solution than among those receiving breast milk and formula is perhaps due to the fact that on the average the former were put to breast more often, and without fail during the night when lapses in technic were more likely to have occurred.

SUMMARY

1. An epidemic of diarrhea of the newborn consisting of 22 mild and 28 severe cases, with 3 deaths, occurred in a Rochester, N. Y., hospital in April and May, 1942.

2. The etiological agent was not determined. Evidence was secured that the feces of sick infants contain an agent fatal to baby Swiss mice in significantly higher proportion than feces of well infants.

3. The incubation period was observed to be as short as 24 hours in 3 cases. The disease tended to select infants below and above normal birth weight. Two of the 3 deaths occurred in infants with birth injury or congenital abnormality.

4. The incidence of illness was significantly greater and more severe among infants artificially fed than among the breast-fed.

5. Opportunity for transmission of infection was afforded by contamination of nipples and formula. Delay and inadequacy in recognition and isolation of cases may have been contributory. The epidemic came to a close following correction of these faults.

6. A second epidemic of diarrhea of the new-born consisting of 21 mild, non-fatal cases occurred in the same hospital in July, 1942.

7. Illness was limited almost exclusively to breast-fed infants. Opportunity for transmission of infection was afforded by probable contamination of a common vessel of 4 per cent boric acid used to cleanse the breasts. The epidemic came to a close following correction of this fault.

CONCLUSIONS

Epidemic diarrhea of the new-born is a disease in which the unidentified etiological agent is present in the intestinal and possibly oral discharges of sick infants. The occasional introduction of the disease into a nursery, probably from an inapparent adult source,² is difficult to prevent. If routine technics permit transfer of infectious discharges through contamination of nipples, formula, and breasts, or indirect transmission by attendants, an

epidemic will occur when the infection is introduced. Insufficient or inadequately trained personnel and faulty equipment contribute to the opportunities for transfer of secretions and excretions. Prevention and control depend upon laboratory controlled methods of sterilizing nipples and formula, good nursing technic, prompt recognition, reporting and isolation of cases, and immediate epidemiological investigation by a competent person, which ordinarily will mean by an epidemiologist in the health department.

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NOTE: Appreciation is expressed to F. Wellington Gilcreas, Associate Sanitary Chemist, and Marion B. Coleman of the Division of Laboratories and Research, New York State Department of Health, for determination of survival time of organisms in boric acid and mouse inoculation experiments, respectively; and to B. F. Mattison, M.D., Assistant District Health Officer, New York State Department of Health, for assistance in investigation of the July outbreak.

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THE WAGNER-MURRAY BILL

THIS bill makes physicians conscious that the heretofore vague shadow of socialized medicine is becoming foreshortened and of some substance. They realize that if this bill were enacted into law the practice of medicine would be changed, and quite definitely changed, for it would place under government auspices medical and hospital care for the great majority of the population of the United States. Funds for the service would be provided through pay roll deductions as a part of the general social security program. Organization would be on a federal basis, physicians being employed through the Surgeon General of the U. S. Public Health Service. Hospital and auxiliary care would be under the same direction.

There would be an Advisory Council, appointed by the Surgeon General from nominations submitted by medical and other organizations. In the program itself, a given physician would participate or not as he chose; he might participate on a fee basis or per capita, or on part- or full-time salary. A beneficiary would have the right to choose his physician from among those participating. The physician would retain the right to accept or not accept a given patient, unless perhaps that physician were employed on a salary basis.

The reaction of most well established physicians in opposition to this bill has been definite, even vehement and bitter in some quarters. An editorial in the *Journal of the American Medical Association* (June 26, 1943) reviews the genesis of the bill, pauses to point out that while "spell of sickness," used in the bill, is poor English, it is at the same time evidence that the medical profession was not consulted as to medical provisions; uses the word "gauleiter" as descriptive of the position of authority proposed for the Surgeon General of the Public Health Service, presents some "quotes" from the bill indicating the extent of that power, and ends by quoting from the *Chicago Daily News* to the general effect that the worker's zeal for social security will be dampened by ever-mounting pay roll deductions inherent in such schemes.

Another editorial in the September 4 issue of the same *Journal* summarizes the June 26 editorial, even to the "gauleiter" term, quotes further from news-

paper editorials unfavorable to the bill, takes cognizance of an editorial, not pro-organized medicine in character, in *Medical Care* (August, 1943), and calls upon the medical profession to prove to Senator Wagner and his colleagues, "by a complete and forceful presentation of the points of view of American Medicine, how far from perfect is the measure (the Wagner-Murray bill) he has proposed."

Another evidence of opposition to the bill is to be found in a pamphlet released and distributed to physicians by the National Physicians' Committee for the Extension of Medical Service. This committee's views on medical care have in the past appeared to reflect the opinions of leaders of organized medicine, and the pamphlet itself tends to emphasize the probable and possible ills and, one cannot help but feel, some imaginary ills that physicians and the public would suffer if the medical service proposals of the Wagner-Murray bill are enacted into law. In contrast, the Committee of Physicians for the Improvement of Medical Care, Inc., which has seemed generally inclined toward government-arranged medical care and does not see eye to eye with organized medicine nor with the National Physicians' Committee, has issued a statement congratulating Senator Wagner on presenting the bill, designates it as a framework and a basis for discussion, and expresses the hope that the Committee of Physicians "will be given an opportunity to participate in the discussions of the bill and to offer its advice and suggestions." An editorial in *Medical Care* has been referred to above.

Thus, to date, there have been only preliminary skirmishes. Opponents of the bill, for the moment, appear to be the more active. Possibly this is because those who favor the medical service proposals count upon the popularity of unemployment benefits and pensions to overcome opposition to the proposals for socialized medicine, the latter being only part of the broad program of social security which this bill is designed to provide. No one person may announce for the American Public Health Association a policy or attitude in regard to this proposed legislation. Only the Governing Council may make a statement of that sort. This much, however, may be said editorially. Most of those who are not emotionally prejudiced in favor of or against this bill see in it provisions that seem reasonable and necessary and implications that may be dangerous. So far as concerns the medical service element, neither its virtues nor its vices would in practice be so superlative as proponents and opponents respectively prophesy. As regards quality and quantity of medical care, some of the present disabilities and deficiencies would perhaps disappear but, at the same time, much that is fine might too disappear. Thus, though care would be more nearly assured to the population at large, that care would inevitably be burdened with the by-products of red tape, perfunctoriness and mediocrity inherent in most civil services, and possibly with some politics.

It is the general implications of the bill, more than the specific medical elements, that cause apprehension among those who attempt to view the matter dispassionately, in that this legislation would introduce socialization on a vast scale, and contemplates an entirely federal administration with complete disregard of state boundaries and sovereignty. It would thus commit the American people to an entirely new order of life, one which heretofore has been experimented with only in a superficial and dilettante fashion. Maybe the ends justify the means, maybe the complexity of the social and economic order of the United States makes the bill necessary and wise. One might wish, however, even though doubting the success of a voluntary scheme, to see some experimentation with less compulsion as to who must be beneficiaries; equally, while one might suspect

that a federally administered medical service would be more effective than the average state administered service, it would seem precipitate, without trial, to exclude state participation so completely as this bill contemplates. Federal-state coöperation has worked admirably in public health matters. In any event, one needs carefully to consider the price, other than financial, that would be paid for the security that this bill is designed to provide.

Whether or not the Wagner-Murray bill is enacted into law, it seems likely that a bill providing medical service of some sort and extent will be passed by the Congress before very long. If this is the case, it would be the part of wisdom for those who are interested in preserving the fine traditions of private medical practice and of private medical research and medical education, to offer some alternative plan or scheme which may do less violence to independent medicine on the one hand and which at the same time would insure to the average citizen a high grade of medical care. Continued blind and hair-splitting resistance, by physicians, to any and all proposals for some degree of public medical service will but tend to strengthen the contention of those who insist that the medical profession is unreasonable in its attitude, selfish in its interests, and lacking in constructive leadership. Convinced of this, the public may give support to legislation detrimental to real progress in medical science and not to the best interest of the people of the United States.

ON THE NEED FOR BASIC KNOWLEDGE

IN recent years and under the stimulation of a somewhat aggressive pedagogical philosophy, there has arisen a tendency to believe that if one knows how to teach or to analyze or administer, then a thorough knowledge of the thing to be taught or analyzed or administered is of but secondary importance.

Out of such a concept, perhaps justifiable up to a certain point, there has developed an alarming smugness among the ill-informed. Not only do these people irritate their betters in the public health field, but, potentially at least, they are in position to do much harm. We concur in the thesis that public health workers must be disciplined to analyze and to synthesize mentally, and we agree that one should not accept encyclopedic knowledge as a test of mental capacity. On the other hand, in modern public health work one must be armed with more than an ability to think straight, even though this ability is a commendable and rare one. In addition, it is necessary that physicians, nurses, engineers, dentists, health educators, and others carrying on health services possess both fundamental knowledge in the sciences basic to public health and detailed information in the special categories in which they work.

These things seem worth mentioning for two reasons. First, because young workers in public health, sometimes discovering an astonishing and distressing lack of technical knowledge in their superiors, may be misled into a belief that ignorance is no barrier to promotion and prestige. It must be admitted that persons rather ignorant professionally do sometimes get along fairly well in the public health field. This, however, is quite the rare exception. When it occurs, the individual concerned possesses some element of personality, force, or smoothness that masks deficiencies in knowledge; or perhaps by his own shrewdness or with the help of his patrons he has been able to grasp time by the forelock. Similar accidents

occur in other fields, too, but the average uninformed person has no grounds and no right to hope that it will happen in his case. The second reason for discussing the necessity and worth-whileness of obtaining and retaining basic scientific information is that young workers in the public health field are inclined erroneously to assume that one may grow in knowledge only by attending formal courses of instruction. This is not true. If one really wants to add to his store of information, there are no places or circumstances in continental United States where, through one means or another, the necessary texts, facilities, and equipment cannot be obtained, providing the urge to knowledge is strong enough. Nor is the opportunity and necessity for learning limited to the younger workers in the public health field. Health officers, executive secretaries, directors, and, if they are diligent, professors, may hope to acquire basic and detailed knowledge of public health.

A side light on what may happen when the uninformed get to chucking their weight about is illustrated by the case of an examiner, in a profession supplementary to medicine, who was long on method but short on fact. Scorning the old-fashioned questions that required narrative answers, she examined by the multiple choice technic and asked candidates to decide whether it is in malaria, typhoid fever, or pneumonia that *Peyer's patches* are found.

Credit Lines

THE COMPLEAT (ANNUAL) REPORTER

AT the request of the Editors of Credit Lines, an Izaak Walton went angling in a sea of health department annual reports a little while ago. Our Izaak is RAYMOND S. PATTERSON, PH.D., Director of Health Education, John Hancock Mutual Life Insurance Company, Boston. Now he displays the contents of his creel. The next voice you will hear will be that of Dr. Patterson.

What's an annual report? Seems a pointless question to ask, doesn't it? But there is plenty of evidence spread out upon my desk to suggest that the question has never occurred to a good many health officers. If, as you will tell me, an annual report is a year's end accounting of the activities of a health department made to the residents of the community, who have every right to know what their health department does for them, then one would suppose the annual report would be, in effect, a message something like this:

Dear Squire (or Dear Mrs. Nabob): Your health department performed these several services to protect and promote your health during the year. We wish that we might have done thus-and-so for you, but we were prevented for these reasons. If you want figures to support our statements, here is a mercifully condensed DIGEST of the complete compilations which are on file in our office and always open for your inspection, so we won't bore you with the details here. If you would like to know the names of your hired help in the health department, here at the close is the staff. We thank you.

Such a yearly "news letter" written

in a pleasing and sprightly style, illustrated with *new* pictures, not too posey, would be read with interest by many of the influential people in town to whom it should be sent, and it would be snapped up by the editor of the local Tageblatt for a news story (perhaps with a nudge from you).

The reason I asked the question, "What is an annual report?" is that most of the tomes displaying that label, and which have come to this desk from a score of American communities, bear so little resemblance to what one would assume a report would be like.

Here is a sort of composite photograph of the majority of city health department reports, with my ill-natured comments in italics.

Title page announces the breathless news, "Annual Report of the Department of Public Health of the City of New ——— 1942." *Why not give your report a title which "says something" about the nature of the year's work. The words "annual report" long ago earned a reputation for deadly dullness.*

Page 1: Long lists of city officials, board members and complete staff of the health department down to the bottle washers in the lab.

These names are chiefly of interest to the owners thereof. If the record is needed why not put it at the back, as a sort of signature to the report? Readers will appreciate your help in getting quickly to the point, if any, of your story.

Page 2: Stilted letter of transmittal to his Honor, the Mayor, and the Honorables, the Members of the Common Council.

Ho! Hum! The reader sighs, maybe we'll get through this verbal trash pretty soon!

Pages 3 to 7 or 8: Mortality statistics, morbidity statistics, plain statistics—about nursing visits, sanitary inspections, and numbers of deceased felines removed from gutters.

By what reasoning do you suppose all the able health officers, who are responsible for these reports, come to the conclusion that readers will wade through these long tabulations? And if they did, would they remember anything useful about local public health administration when the reading was done? (Both questions are rhetorical.)

Pages 9 to 12: Uninspired narrative reviewing in most prosaic words possible to find, every single activity of the health department throughout the year; with newsworthy items smothered between "the same old stuff."

Dear Doctor Health Officer: Your report is a letter (in effect) telling the Squire a few things he should REMEMBER about your activities of the year! So dress it up. Use "picture" words, and real pictures too if you can get good ones! Accent the high lights with flashes of descriptive writing! Don't put your reader to sleep!

We've said enough! Too much, in fact.

From among several excellent reports I select this annual accounting from the Southland as a good example of the way it might be done.

The cover of this 16 page, photolithographed and economically printed brochure is eye-catching, with a striking silhouette of a statue of a soldier on guard. The title is "Keeping Watch," the place is Forsyth County (Winston-Salem, North Carolina), the year is 1942.

The foreword "Keeping Watch—Over Health" reminds the reader that the job is a responsibility in which he

has a definite part, to look after his own and his family's health and to take an intelligent interest in the public's health. A striking contrast of photographs of business tower and share cropper's cabin drives home (on p. 3) the point that public health is the health of *all* the people. On the pages that follow is told the story—in unposed, convincing pictures, with captions that "say something" about them, not mere labels—of the health department's services for expectant mothers, infants, toddlers, and school children, and how it helps to guard against communicable diseases, including tuberculosis and syphilis, and what it does to improve community sanitation. At the end of the story is listed the staff.

A postscript entitled "Good . . . But Not Good Enough" reproduces the citation of the Inter-Chamber Rural Health Conservation Contest and under the picture of a bright-eyed urchin, are listed all the laudable and reasonable objectives to which the department is "Looking Forward."

That, good friends, is one swell report. To its producers I doff my cap, mightily impressed with the interpretative brains, the sparkling ingenuity, and the plain hard work that went to make it what it is.

There are other good reports that might have been mentioned: the always excellent New York City year book, for instance. But had that one been chosen, many readers would have shrugged it off with a "Why shouldn't New York have a good one? Now in my case . . ." Birmingham, Alabama, again "rings the bell" with a report entitled "Public Health and a National Emergency." But Winston-Salem's deserves to stand out sharp and clear, not to be overshadowed by the competition of publications from bigger and wealthier places.

RAYMOND S. PATTERSON

ADVICE ON LANTERN SLIDES

Dr. James E. Perkins, Director of the Bureau of Communicable Diseases, New York State Health Department, is Secretary of the Association's Epidemiology Section. He has just sent a mimeographed letter to all the speakers on his Section program at the War-time Conference in New York City, October 12-14, giving some excellent advice on the preparation of stereopticon slides. Because slides are so generally used to illustrate scientific papers, we share his communication with *Journal* readers. Unfortunately we cannot reproduce the effective examples referred to in the second paragraph, but Dr. Perkins would be glad to send copies, we feel sure, to any inquirers. The text provides a good idea of what they are. This is the letter:

TO ALL SPEAKERS ON THE PROGRAM
FOR THE EPIDEMIOLOGY SECTION,
AMERICAN PUBLIC HEALTH ASSO-
CIATION:

An excellent paper can be ruined by lantern slides which are not legible or fail to present the message which the speaker wishes to convey. No doubt you, yourself, have at times groaned when a slide has been thrown on the screen which was legible only to those sitting in the first two rows (if to them). Hence, this routine communication to all speakers on the Epidemiology Section Program, suggesting care in the preparation of slides.

The slide should be a condensation of the important points, and not a work sheet. Example 1 shows the type of table that is really a work sheet and has too much data to enable the audience to grasp the material contained therein. Because of the numerous categories, the figures on such a table will be visible only to the first row or so. Tables as complicated as this have not infrequently been presented before the Section. Such a table should be broken down into several simple tables. Example 2 shows a condensation of part of the data given in Example 1, and represents a slide actually presented before one of the meetings of the Epidemiology Section. Some of the other data in Example 1 were presented in separate equally simple slides.

Remember that the tables used in the slides do not have to be the same tables in the paper presented for publication. Published tables can be more elaborate and contain more data, since the reader can study them at his leisure, but tables used for lantern slides should give only the essential data necessary to make the point desired.

Material on the slide should be not more than fifteen lines deep (and preferably about half that) and contain not more than half a dozen categories horizontally. If such data are well distributed over the slide, the projected image will be legible at the rear of the average size meeting room with the usual projector and usual screen.

Summarizing, then, please attempt to have your tables for lantern slides (1) present only the condensed summary of the important points, (2) comprise not more than fifteen lines, including the title, and not more than six columns across, (3) be so composed and so prepared by the slide maker that this material covers the slide, so that proper magnification will occur upon projection.

We will do our part by seeing to it that there are provided a good screen and projector, in good working order.

LEST WE FORGET

Those of the younger generation who are inclined to forget what the sanitary base line was against which our recent progress may be recorded will find pleasure in reading Professor Yandell Henderson's essay "Recollections of a Street Corner Pump and the Progress of Sixty Years" in *Science*, Vol. 98, No. 2532, pages 25-28, July 9, 1943. It is an interesting account built around Professor Henderson's experience in Louisville, Ky., where he was associated with distinguished members of the Flexner family, Simon and Abraham.

DO YOU AGREE?

President Roosevelt's recent message to Congress requesting \$400,000,000 for housing for war workers, thus bringing the total authorization for this purpose under the Lanham Act to \$1,600,000,000, brings to mind a comment of Professor C.-E. A. Winslow, speaking before the Eleventh Annual Meeting of the National Association of

Housing Officials in New York City. Professor Winslow was roundly applauded when he said:

"We are all familiar with the signs customarily placed at the entrances of new housing projects for war workers pridefully crediting the projects to the local and federal agencies responsible for them. We should feel less apprehensive about the future if they were changed to read: 'This is War Housing, necessary but regrettable. To be demolished immediately upon the cessation of hostilities!'"

Subsequently, Commissioner Emerich of the Federal Public Housing Authority, officially endorsed Professor Winslow's principle in his recommendations for post-war demolition of war housing. One plank in his program was that "Temporary housing built to substandard plans in order to save time and critical materials should be removed." In fact, there was rather wide agreement during the meetings of the National Association of Housing Officials that the glorified shoe-box dwellings built during the war (1,100,000 so far) must be got rid of promptly if the progressive housing movement is not to receive a serious black eye, and if public health and social workers are not to be confronted with new slum areas to harbor additional disease and misery.

A PATTERN FOR HANDLING REJECTEES

The Public Health Federation of Cincinnati, of which Bleecker Marquette is Executive Secretary, has published a 6 months' report on a consultation service for men rejected at the Cincinnati induction station whose cases were reviewed under the auspices of the Public Health Federation, in cooperation with the Cincinnati Board of Health. Those who are seeking to find a pattern of good relationships between a voluntary agency, the board of health, and the armed forces, would do well

to review the way these consultations have worked out in Cincinnati. Although primarily emphasizing the rejections on account of tuberculosis, the report also includes the cases rejected because of heart disorder, hernia, mental defects, syphilis, and other causes.

QUOTABLE ITEMS

"The vast majority of persons will not see a known case of tuberculosis unless they visit a hospital. What they know about tuberculosis, therefore, will be what we tell them, what health education gets over to them, and what new traditions are established in regard to a disease with which most people have no personal contact. This situation calls for more and better, and more continuous, health education as to tuberculosis."—Homer Folks, July, *N.T.A. Bulletin*.

From a bulletin board in a Wisconsin mill where a tuberculosis survey was being made, "If every person in our mill but one has his lungs examined, that one is protected 100 per cent, but all the others are not protected from him."

"The efficiency of a board of health and the respect which will be shown it in a community will depend very much upon the firmness with which the members insist upon a strict compliance with all needful sanitary regulations as well as the caution they display in avoiding needless exactions and unnecessary investigations."—Honorable Leroy Parker in the *Annual Report of the Michigan State Board of Health for the year 1879* and published in *Health News*, New York State Department of Health, July 19, 1943, under the caption "Still True."

MORE ON EPIDEMIC VOMITING DISEASE

Apocryphal of an editorial entitled *Is There an Epidemic Vomiting Disease of Winter?* which appeared in our April issue, readers of the *Journal* may be

interested to know that an article on this subject was published in the March 13, 1943, number of the *British Medical Journal*. An abstract of the article appeared in the *Journal of the American Medical Association*, June 12, 1943. For this information we are indebted to Dr. John J. Sippy of California, who has himself studied epidemic vomiting outbreaks.

AWARDS FOR MILK PRODUCERS

J. L. Rowland, the Chief Sanitarian of the Oak Park, Ill., Department of Health, has announced a quality milk program offering to each milk producer a certificate of award "in recognition of noteworthy achievement in sanitation and quality milk production."

The requirements include a methylene blue test of 6 hours or more and bacterial counts not to exceed 200,000. The number of defects on the inspection sheet is limited. A persuasive letter explains the proposal to the milk producers and is signed by Gilbert P. Pond, M.D., Commissioner of Health.

THE OWI

The Office of War Information has been the recipient of many brickbats and of few bouquets. We timidly approach with our nosegay. Of course anyone on their mailing list received a great deal of material before an unappreciative Congress curtailed their domestic activities. The reason is simple. This is a big war, affecting every one of us in every aspect of our living, and there was much to say about it. Naturally a large amount of what was said had nothing to do with the particular problem on your mind when the daily releases or special publications popped up in the morning's mail. But a good deal that was seemingly extraneous at the moment was genuinely informative to people aware of their century. These additions to general knowledge and background in-

formation were painlessly made. Further, and more practically, they could be drawn from or quoted (no copyright) to put the stamp of timeliness on a piece of printed matter or a speech to disguise the fact that the same old record was about to be played.

The "true story" about absenteeism, told by OWI, and one on British in-plant canteen services, to select two for mention from a great many quite as worthy, were for us as citizens first and as public health workers second—and good reading all the way.

News from the Department of Agriculture, from the Bureau of Mines, and from the Federal Security Agency, released in one day through OWI, all contained pertinent information for health workers and were published in the *Journal*.

The thorn in our nosegay to OWI is turned so that it pricks us. They made their stuff so interesting that many times the problem on our minds when the morning mail was tackled was still there at noon. That article on kok-saghyz, the Russian rubber-producing dandelion, for instance, contained not an implication that the plant has any food value to assuage our sense of guilt at having read every word. We are going to miss things like that and similar pieces of "fourth term propaganda."

MANUAL FOR VOLUNTEERS IN MASS CHEST X-RAY EXAMINATIONS

As an outgrowth of experience in chest x-ray examination projects on a large scale which were organized and conducted jointly by the Hartford Board of Health and the Hartford Tuberculosis and Public Health Society, a *Manual* has been prepared for guidance of volunteer crews that may be called upon to participate from time to time in such projects under health agencies.

The outline covers the services of the

supervisor, the dressing room attendant, the registrar and dark-room operator. Copies of the *Manual* may be obtained on request from the Hartford Tuberculosis and Public Health Society, Hartford, Conn.

WORTH ACQUIRING

Manual of Industrial Nutrition, first in a series to be prepared and distributed by the Nutrition in Industry Division, Nutrition and Food Conservation Branch, Food Distribution Administration, Washington, D. C. Contains brief chapters on the National Nutrition Program for Industry, on the nutritional status of industrial workers, basic and special considerations for an "in-plant" program and source lists of posters, pamphlets, films, news services, and radio scripts.

Leaflet on *Meningococcus Meningitis*, from Health Department, Baltimore, Md., Huntington Williams, M.D., Commissioner.

The Woman's Home Companion for June for its article "Change Your Food but Keep Your Figure"—reassurance that food rationing need not affect weight.

The Architectural Forum for May for its plans and drawings of the post-war hospital and health center.

The Bulletin of the Health Organization of the League of Nations, Vol. X, No. 1, devoted to Typhus Fever.

"What's More We Like It!" subtitled "Greenwich Answers to the Leaner Larder." Not every community has a Hendrik Willem Van Loon resident therein and not every Tuberculosis Association could induce him to illustrate a book of wartime recipes. The Greenwich, Conn., Tuberculosis Association has done just that and turns out a generous cookbook with all the right advice temptingly presented.

The February (Twentieth Anniver-

sary) issue of *Channels* published by the National Publicity Council for Health and Welfare Services, Inc., 130 East 22nd Street, New York, N. Y., for its Publicity Directory which selects the most useful publications on how to use media and a list of major sources of publicity material (40¢).

Rheumatic Fever in Children—Its Recognition and Management, a 32 page clinical handbook written for the practising physician. A limited number of copies are available from George M. Wheatley, M.D., Assistant Medical Director, Metropolitan Life Insurance Company, 1 Madison Avenue, New York, N. Y.

The War and Social Problems—A Selected Bibliography, material to April 1, 1943, compiled by Karl A. Baer for the Russell Sage Foundation, 130 East 22nd Street, New York, N. Y. (20¢). References are classified under such headings as women, children, and young people, general health problems, nutrition, social hygiene, mental hygiene and morale, post-war planning, etc.

Radio Script No. 156, "The Story of One of Us," by Hubert Chain, published by the Radio Script Service and Girl Scout News Bureau, 155 East 44th St., New York, N. Y., for its dramatic handling of the experiences of American Red Cross nurses in Bristol, England, during the paratyphoid epidemic. It brings in the Medical Officer of Health of Bristol, Dr. Robert Hughes Parry, Elizabeth Phillips of the Henry Street Nursing Service who has been on the staff of the American Red Cross in England, and others.

The new publication of the National Tuberculosis Association on *Personnel Problems of Sanatoria Resulting from War Conditions*, for its systematic canvass of facts on personnel in a cross-section of American sanatoria. It is succinct and to the point and the mem-

bers of the Committee on Sanatorium Standards of the American Trudeau Society, of which Victor F. Cullen, M.D., is Chairman, are to be congratulated for producing this practical document.

An article entitled "Nutrition Exhibit, East Orange (New Jersey) Health Department, 1942," by Frank J. Osborne, Health Officer, for its careful inclusion of the sources of all display material and printed matter used in an ambitious five section exhibit. Reprints free on request to Mr. Osborne.

This week, and every week, "Health Articles of the Week, an Index to Current Periodical Literature on Public Health," compiled by the National Health Library, 1790 Broadway, New York, N. Y. Now in its 23rd year of publication, this weekly reference list averaging 4 mimeographed pages, directs attention to the important articles in all health and medical magazines under such headings as general, cancer, child welfare, communicable diseases, eyesight conservation, health education, health insurance, heart disease, industrial hygiene, mental hygiene, national defense and war, nursing, nutrition, tuberculosis, venereal diseases. Sample copy on request; subscription \$2.50 per year.

PUBLIC HEALTH IN MICHIGAN MARKS ITS 70TH BIRTHDAY

The July issue of *Michigan Public Health*, published by the State Department of Health, is given over to a historical review of 70 years, since July 30, 1873, when the Michigan State Board of Health was created. The story includes many of the persons who have left the impress of their lives on Michigan during these years. Its effect is to build up public appreciation for public service rendered through health agencies.

"THE BEGINNINGS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION"

Under the title "The National Quarantine and Sanitary Conventions of 1857 to 1860 and the Beginnings of the American Public Health Association," Harold M. Cavins, the Assistant Professor of Hygiene in the Eastern Illinois State Teachers College, Charleston, Ill., has published a paper in the *Bulletin of the Institute of the History of Medicine*, Vol. XIII, No. 4, April, 1943.

In view of the fact that the original sources of much of this information are difficult of access generally, the public health profession is in debt to Professor Cavins for putting this review on record. It is a very readable story.

BOOKS AND REPORTS

The Food You Eat—A Practical Guide to Home Nutrition—By Samuel and Violette Glasstone. Norman: University of Oklahoma Press, 1943. 277 pp. Price, \$2.25.

The first few chapters of this book stress the physiology of nutrition, its relation to health, and the processes of digestion and energy metabolism. Next in order, mineral elements and water, then vitamins are discussed. A chapter on food products discusses the various groups of foods—cereal foods, dairy products, etc.—and the last chapter is devoted to "Planning the Menu." A section at the end of the book "Practical Nutrition in Outline," gives a brief summary of daily menu planning and of the requirements, functions, and sources of the various food components.

The title of this book leads one to think it is written for the homemaker, or at least for the lay reader. The use of words like creatinine, protein linkings, amino acids, and sterols do not add to the value of the book for lay persons. The use of these technical terms marks the book as a reference text for high school or young college students. As a matter of fact, the book is too technical and too wordy for easy popular reading. It is not a new approach to the subject of nutrition but a repetition in heavy detail. One is led to conclude, therefore, that the authors, one a physical chemist, the other a plant physiologist, were not conversant with nutrition in its relation to the problems of homemakers to discriminate as to what might be omitted and still have the story of nutrition effectively told.

For the most part the information is accurate. However, there are statements which might be questioned. The

chapter devoted to menu planning often reverts to the authors' whims instead of being based on scientific facts. Because they eat little or no breakfast does not make the practice a sound one, neither is there a scientific reason for the omission of bread in certain meals, nor is there any reason why lunches should always contain sandwiches, nor that milk should be omitted from a meal when lemon meringue pie is eaten.

It is to be regretted that the authors chose to use the terms P.P. factor instead of niacin, vitamin B₁ and vitamin B₂ instead of thiamin and riboflavin, respectively.

MARIETTA EICHELBERGER

Miracles of Military Medicine—By Albert Q. Maisel. New York: Duell, Sloan and Pearce, 1943. 373 pp. Price, \$2.75.

This book discusses very important matters and contains some reliable information, but it is a typical example of the danger of a layman writing on technical subjects. A few instances will suffice.

The author says that diphtheria antitoxin is more properly called "toxin-antitoxin" since it contains "not only the good antigens but also the bad diphtheria toxins." In regard to tetanus, he says that "until the first World War all cases were untreated." In 1897 Nocard sent tetanus antitoxin to 63 veterinarians, advising its use after operation. Among 2,727 animals so treated not one developed tetanus, while 259 untreated animals developed tetanus. Between 1898 and 1906 in France, 13,124 animals operated upon or wounded accidentally received antitoxin as a prophylactic, with not one case of tetanus (Vaillard). By 1905

the nonmedical officers of the French Army had been instructed to have all cases of wounds in army horses treated with tetanus antitoxin, yet according to the author, one would think that Ramon's work in 1926 in the French Army with his anatoxin was the first attempt to prevent tetanus in the cavalry, and he says "the rest of the world was just beginning to wake up to the import of his tetanus discovery." We give all credit to Ramon for his work, but alum precipitated toxoid, now almost entirely used, was described by Glenney *et al.* in 1926. It is true that the commercial manufacture making it generally available did not start until considerably later in this country.

In 1903 the *J.A.M.A.* began its campaign for the treatment of Fourth of July toy pistol and fireworks wounds. In 1914, among 1,506 such wounds, there were only 3 cases of tetanus and in 1916 there was not a single case.

These examples seem sufficient to put this book where it belongs. It will probably interest some readers and may do some good. The author is "conscious of the pitfalls that beset the lay writer who ventures a popular discussion of medical subjects," and gives an imposing list of men, mostly well known, who gave him information for his book. It seems to go without saying that the text was not submitted to anyone who knew anything about bacteriology. The book cannot be recommended as it will spread misinformation as to dates, credits, and facts.

MAZÏCK P. RAVENEL

Blood Groups and Transfusion—
By Alexander S. Wiener, M.D. (3rd ed.) Springfield, Ill.: Thomas, 1943. 438 pp. Price, \$7.50.

In Wiener's *Blood Groups and Transfusion*, a well bound and well printed volume, the author has added two new chapters in this third edition which is printed 38 months after the second in

1939. This volume summarizes as the author proposes: the present knowledge concerning the theory and technic of blood grouping; its application in clinical, legal and veterinary medicine and in anthropology, and assembles and integrates the essential facts concerning the transfusion of whole blood, plasma, and serum.

The volume is well illustrated with 69 figures, and many essential data are assembled in 106 tables. The handling of the accumulated literature is accomplished by references placed at the bottom of the page and by a General Bibliography at the back of the book. In this section also there is an appendix treating by statistical means the calculation of the genes A, B, and O if the distribution of the blood groups is known. The subject index is covered in 11 pages. There is no author's index.

In the new chapter on transfusion of stored blood, plasma, and serum, reference is made to Robertson's transfusions of stored blood in World War I. Due credit is given to work of Filatov and Bagdassarov in Russia and to the establishment of the first blood bank in this country at the Cook County Hospital by Fantus.

The question of survival of the transfused stored erythrocytes is well answered by the author's experiments using anti-M and anti-N agglutinating sera. These tests conclusively show that while fresh blood or blood only a few days old survives for periods up to 3 or 4 months, older blood disappears from the patient's circulation much sooner: i.e., blood stored for 21 days was found to survive only 24 hours. The author rightfully emphasizes the necessity of the collection of stored blood under a closed system, because the greatest problem in relation to plasma and serum transfusion is the prevention of contamination by bacteria and fungi. The safety of pooled plasma

is enhanced by pooling ten or more samples because the titer of the isoagglutinins is diminished by the factor of dilution and also to some extent through the neutralization of the isoagglutinins by group substance in solution. Various methods of drying plasma are presented with the correct admonition that plasma dried from the frozen state is to be preferred.

The second new chapter "Factors Rh and Anti-Rh of Human Blood" marks a lasting advancement not only because of the clinical importance of the Rh factor in reactions associated with repeated transfusions but also in the field of obstetrics in which the Rh factor is concerned with erythroblastosis foetalis, neonatal deaths, miscarriages, and congenital anemia of the new-born. Landsteiner and Wiener have shown that the Rh agglutinin is a dominant gene. The chapter is purposely headed "Factors Rh." With the aid of standard anti-Rh sera, individuals are divided into only two types: Rh-positive and Rh-negative, the ratio being 85/15 among the white population. Wiener, however, shortly after the discovery of the first Rh agglutinin, obtained from the serum of a patient who had a hemolytic reaction, an irregular agglutinin which acted on 70 per cent of bloods. A third type of human anti-Rh serum gives about 87 per cent positive reactions with the bloods of white individuals (Levine).

This knowledge will not only explain much of the pregnancy wastage due to mis-mating but will lessen intra-group hemolytic reactions, particularly those seen in certain pregnancy cases.

This book should become the standard text in medical schools and should be in the possession of all blood banks.

JOHN SCUDDER

Guide to the Inter-American Cultural Programs of Non-Government Agencies in the United States. Com-

iled for the use of the Office of the Coordinator of Inter-American Affairs. February, 1943. 181 pp.

The *Guide to the Inter-American Cultural Programs of Non-Government Agencies in the United States* is a worthy attempt at a comprehensive listing of nonofficial organizations in this country with Inter-American interests.

The format is somewhat sketchy, but the context should be valuable from a reference standpoint even though some omissions must be expected in an initial work of this nature. The descriptions of these agencies and institutions is entirely uncritical, but the outline of their activities and the names and addresses of their principal officers should be very useful to those individuals and officials who have to do business with the other republics.

EDWARD C. ERNST

Cases of Syphilis under Treatment in Cuyahoga County during March 1942—By Howard W. Green. Foreword by Dr. James A. Doull. 62 pp. Paper.

This report is the fifth in a series of consecutive annual statistical studies of patients treated for syphilis during the month of March, 1942, in Cleveland, Ohio. Since the schedules from which the information was compiled are identical with those used in 1938, 1939, 1940, and 1941, it is obvious that changes in the extent of syphilis under treatment, whether infectious or non-infectious, new or old, and treating agency can be easily ascertained. The study is presented mainly in the form of tables, charts, and graphs, with a minimum of text. An excellent summary recapitulates the findings of individual phases of the entire project, which provides factual data on the treatment status of syphilis in a large urban community. The observations recorded and problems encountered parallel those in similar areas.

The coöperation of the physicians of the community in answering the questionnaire (99.7 per cent replied) indicates a very helpful attitude on the part of the medical profession. Physicians treated more cases in 1942 than in the previous year; one wonders what effect the reduction of physicians in the civilian community, caused by the needs of the armed forces, will have on this finding next year, and whether the community facilities for the care of a larger load are adequate, particularly in view of the comment on page 57 "facilities for the treatment of syphilis in several of the hospital out-patient-departments are still being severely over-taxed by the enormous number of cases under treatment."

It is noted that the vast majority (83 per cent) of all cases of syphilis under treatment were non-infectious. It would be interesting to learn what percentage of these cases had already received the maximum benefit of therapy and for this reason should have been placed on "observation status" and no longer treated. In this connection the significance of Dr. Vonderlehr's recent statement becomes increasingly important "evidence shows that late and late latent syphilis now receives more attention in public clinics than is justifiable from a public health standpoint. It is essential that everything possible be done to provide adequate medical treatment for early patients and to discourage the attendance of the others, beyond the time when adequate treatment has been given. This idea should also guide the case holding." The problem of the patient with infectious or potentially infectious syphilis who lapses treatment before being rendered permanently non-communicable is emphasized.

The author and the Joint Social Hygiene Committee of the Cleveland Academy of Medicine and the Cleveland Health Council, which sponsored

this study, are to be commended on an important contribution to the literature of syphilis control in this country.

THEODORE ROSENTHAL

Discovering Ourselves—A View of the Human Mind and How it Works—By Edward A. Strecker, M.D., and Kenneth E. Appel, M.D. In collaboration with John W. Appel, M.D. (2nd ed.) New York: Macmillan, 1943. 434 pp. Price, \$3.00.

There can be little or no question concerning the need for more general dissemination of the methods of maintaining emotional health. Nor can there be question about the difficulty of communicating these methods to the public. In the second edition of the authors' popular presentation attempts are made to reduce the tabu of emotional and mental phenomena by recourse to simple definition and description of human emotions. These attempts are illustrated by clinical anecdotes and graphs. The additional chapters which concern emotion, anger and fear are of timely significance in the present world crisis with the need for adaptation to unrest and change.

In an appendix a series of questions are asked in an attempt to test one's understanding of the topics discussed. While it is quite possible, as the authors state, that one will experience a practical exercise in psychiatric therapy and promote one's own mental health, asking and answering questions may be far afield from the goal of effective emotional insight. One always has to consider the plight of the starving man who found a menu card of little value in appeasing his hunger.

The therapy that is favored throughout the book is that of greater self-knowledge concerning both the nature of mental conflict and the various means of dealing with it. The authors express confidence that such self-knowledge will do much toward attaining more

constructive methods of emotional adjustment.

JOHN ROMANO

Building Morale—By J. B. Nash. *New York: Barnes, 1942.* 154 pp. Price, \$1.00.

This book is unfortunately representative of a considerable number of publications and utterances upon morale. Written in an ecstatic, rambling style, it proceeds in a series of exhortations and emotional crescendo to its end without at any time bringing forward either valuable theory or practical planning concerning morale.

This phenomena of human behavior, morale, has attracted the liveliest attention from men of the most varied experience and attainment. Fascinated apparently with what has been accomplished by the Nazis through psychological warfare, representatives of the clergy, the army, journalism, women's clubs, and those interested in the cultivation of victory gardens have all hastened to express themselves. The results, as here, have been almost uniformly unfortunate. Morale is a part of human behavior and can only be dealt with informatively by those who have a background of training in the sciences which are concerned with that field.

D. EWEN CAMERON

Social Hygiene Year Book—1942. *The Program in Action in the States and Communities.* *New York: American Social Hygiene Association, 1943.* 252 pp. Paper. Price, \$1.00.

This paper bound volume collects, under one cover, a series of summaries of "current events and progress on the forty-eight fronts" which appeared in the *Journal of Social Hygiene* for April, May, and June, 1942. It aims to report the work of official and voluntary agencies since the last report, in 1938, and it is described, further, as "No. 1 in a new Journal series on Social Hygiene in Wartime."

State by state, in alphabetical order, it reviews the expansion of the programs of state and large city health departments and social hygiene societies, primarily as they are related to the war. It ranks each state according to population, indicates the number of A. S. H. A. members in each, provides a directory of state and national official and voluntary agencies concerned with social hygiene, and the names of their current executive officers.

The program material provides a fair indication of the current direction of the social hygiene program. Being a "progress report" it does not attempt to present the over-all social hygiene program of each state, although in some instances, this is woven into the progress report. Thus, the material is rather "spotty" in that it permits a view of some of the high points of the superstructure, but relatively little of the main edifice or its foundation.

There are four appendices, which outline the A. S. H. A. program, reproduce "important letters and documents," present and discuss certain "social hygiene laws and regulations," and display a collection of charts, tables and propaganda.

N. A. NELSON

Public Health and Preventive Medicine—By Morton C. Kahn, M.A., Ph.D., D.Sc. *Oxford Medical Outline Series.* *New York: Oxford University Press, 1942.* 2 Vol. 534 pp. Price, \$4.00.

An attempt to condense the entire field of public health into two pocket size 250 page books is a difficult feat. The author's solution has been to devote 390 pages to the Transmissible Diseases, but only 77 pages to Environmental Hygiene, and 48 pages to Public Health Administration. Obviously, the Transmissible Diseases overwhelm the rest of the Outlines. As an example, the 5 pages devoted to Anthrax and the 7 to Botulism outnumber the entire

presentation of Industrial Diseases. The latter discussion consists merely of 4 pages assigned to Silicosis, Asbestosis, and Lead Poisoning, and of 7 pages wherein are listed inorganic and organic chemical poisons with their industrial exposures. In the section devoted to the Environment, there is no presentation of illumination, no mention of food and restaurant inspection under Food Sanitation. Three full pages are devoted to Certified Milk, and 1 to the New York City milk supply, without mention of the phosphatase test. Under *Water*, no allusion is made to softening nor to taste and odor control. Orthotolidine is mentioned under *Sewage* but not in *Water*. The discussion of nutrition is confined to listing the vitamins and outlining their sources, requirements, stability, effects of deficiency and therapeutic doses, and to listing the essential amino acids.

Public health workers and students desiring an outline of communicable diseases will find these Outlines useful. These various diseases are presented under the headings of Etiology, Symptomatology, Epidemiology, Transmission and Prevention, with appropriate subheads. There are few inaccuracies in these sections. However, some appear. On page 404 yellow fever vaccine is rightly claimed to be produced from chick embryo, while on page 346 it is said to be grown on the chorio-allantoic membrane. One would hardly concur with the suggestion (page 464) of waiting for a Widal test to eliminate typhoid fever in the differential diagnosis of trichinosis. In the section on typhoid fever the importance of blood cultures in early diagnosis is properly stressed, although the technic (page 222) is poorly described: "During the first 10 days take several specimens of blood and plant in nutrient agar." Furthermore, one does not obtain fecal specimens from the duodenum.

The section of Environmental Sani-

tation has gross inaccuracies. Mussel poisoning (page 14) "may be a sex toxin due to spawning" (no mention of *Gonyaulax*). "All ground which cows traverse should by proper drainage be kept free from mud, puddles and manure" (page 29) is a statement which could have been eliminated with benefit. In *Refuse Disposal* the method used with success from New York to San Francisco, Fill and Cover, is not defined specifically. Its closest approximation is "mixing organic refuse with ashes." The description of an Imhoff tank is as follows (page 49): "A large cylinder has an upper chamber connected to a lower chamber by a funnel with a slit in the bottom . . . Gases thoroughly mix the old and new sewage in the upper chamber." The description of the activated sludge process would make it a discontinuous instead of continuous process.

Public Health Administration is also weak. Allocation of space is without much discrimination. Ten pages are given to the United States Public Health Service with only 3 pages to State, 5 to County, and 6 to City Health Departments. Actually, state and local venereal disease control is outlined under the United States Public Health Service. The Outline is inaccurate in listing as separate categories in Personnel of the State Department of Health both a Commissioner of Health and a State Health Officer.

Unqualified, sweeping statements consequent to outline form are particularly objectionable in this section on Administration. It is declared unwise to have a commissioner appointed by a governor, although, properly safeguarded, many would disagree with this opinion, and no alternatives are mentioned. On the other hand, the State Health Officer "selects and discharges subordinates" (page 482) (without regard to Merit System?). "School children should be tuberculin tested and

x-rayed" (page 470) (including grammar school children?). "Medical examination and treatment must be provided for workers" (page 472) probably alludes to industry, but is so presented that apparently it refers to the Municipal Health Department. On page 477, laboratories are dogmatically forbidden to County Health Departments while "at least $\frac{1}{4}$ of the budget" of County Health Departments "should be permanently subsidized by the State" (even in large, wealthy counties?).

The Outlines are well printed and have an excellent index. Blank pages are interspaced every 5 to 8 pages for notes. However, aside from the sections on Transmissible Diseases, the books will have a very restricted usefulness.

CHARLES E. SMITH

Transactions of the Ninth Institute on Public Health Education—New York: American Public Health Association, 1943. 56 pp. Price, \$1.00.

This volume is a valuable contribution to material on health education. We were asked the other day where and how one would find the best examples of health education in this country that might be visited and studied, or that might be reviewed by correspondence. We expressed the opinion that when this volume appeared it would constitute such a source of information and guidance, and we believe that it does.

In this report of the proceedings of the Health Education Section in St. Louis, one will find the products of up-to-date conference methods—informal group discussions with well selected panel leaders, assembling and interpreting information regarding community activities as laboratory material, all based on a recognition that maximum results necessitate a community plan, though not a universal standard pattern.

The "large urban area" is ap-

proached from many angles, including the participation of the schools in teaching health behavior and the rôle of the public health nurse as an educational influence in the home. The "smaller urban area" discussion brings out interesting references to the "Bridgeport Plan"; to the development in a populous community of volunteer workers, assisting the public health nursing personnel; to the organization, in certain southern areas, of district or block neighborhood groups (going back, perhaps unconsciously, to the Cincinnati Social Unit Experiment of 1916). Explored, also, are the activities and needs of the "urban-rural area" and the "rural area."

Dr. Philip S. Platt, fresh from the National Health Council study of voluntary health agencies, interprets public health effort as a phase in public relations. School and health department relationships are summarized by authorities in that field, such as Dr. Mayhew Derryberry, and Dr. George M. Wheatley, while exhibit technics are expertly interpreted by Homer N. Calver and Dr. Bruno Gebhard—from the angles of both war and peacetime needs.

This report reflects that throughout this session there was a keen awareness of the current political implications of public health work in general and of health education in particular. In this country we are choosing afresh the methods of democracy which, in public health as elsewhere, must depend on education. The Institute feels that our problem in this country is to create among individuals and communities "an understanding of and a desire to take part in the solution of their own health problems." Professor C.-E. A. Winslow in his keynote address, "Health Education in a Democracy," said: "The problem today is 'Can we on our side achieve coöperative action by common consent? Can we

do it in the war? Can we do it in the peace that follows? ”

Finally, there is also indicated an awareness that if we are to have sound health education, we must have soundly trained health educators. Standards and qualifications must be recognized and met—a point stressed by Dr. William P. Shepard in his address at this session, on “Educational Qualifications for Health Educators”—a report of the Committee on Professional Education of which Dr. Shepard is Chairman, and which has subsequently become available through the A.P.H.A. *Journal* and otherwise. As Dr. Shepard points out: “A great advance will be made when educators and public health authorities can agree on the functions,

responsibilities, values, and training of those professional people who wish to devote themselves to the field of health education.”

Of course, we would expect such an Institute to be good under the direction of a committee and faculty that contains such additional names from the public health roster as Dr. Horning (director), Dr. Bauer, Dr. Coffey, Miss Connolly, Dr. Halverson, Dr. Hiscock, Miss Jean, Dr. Nyswander, Mrs. Routzahn, Dr. Turner, Dr. Wilson, Dr. Amyot, Dr. Clarke, Dr. Douglas, Dr. Gudakunst, and Mr. Marquette—to name only a few. The report also contains an excellent bibliography of 46 pertinent references.

DONALD B. ARMSTRONG

BOOKS RECEIVED

MUNICIPAL AND RURAL SANITATION. Victor M. Ehlers and Ernest W. Steel. 3d Ed. New York: McGraw-Hill, 1943. 449 pp. Price, \$4.00.

THE SCIENCE OF NUTRITION. By Henry C. Sherman. New York: Columbia, 1943. 253 pp. Price, \$2.75.

KAISER WAKES THE DOCTORS. By Paul de Kruif. New York: Harcourt, Brace, 1943. 158 pp. Price, \$2.00.

UNBIDDEN HOUSE GUESTS. By Hugo Hartnack. Tacoma, Wash.: Hartnack, 1943. Vol. I. Price, \$12.00.

A SURVEY OF ALCOHOL EDUCATION IN ELEMENTARY AND HIGH SCHOOLS IN THE UNITED STATES. By Anne Roe. New Haven: Quarterly Journal of Studies on Alcohol, 1943. 132 pp. Price, \$1.00.

MATERNAL OVERPROTECTION. By David M. Levy. New York: Columbia, 1943. 417 pp. Price, \$4.50.

CHRONIC PULMONARY DISEASE IN SOUTH WALES COALMINERS. II Environmental Studies. His Majesty's Stationery Office, 1943. 222 pp. Price, \$3.00.

SEX IN MARRIAGE. By Ernest R. Groves and Gladys Hoagland Groves. 3rd Ed. New York: Emerson, 1943. 224 pp. Price, \$2.00.

HUMAN GASTRIC FUNCTION. An Experimental Study of a Man and His Stomach. By Stewart Wolf and Harold G. Wolf. New York: Oxford, 1943. 195 pp. Price, \$4.75.

ANOPHELES GAMBIAE IN BRAZIL—1930 TO 1940. By Fred L. Soper and D. Bruce Wilson. New York: Rockefeller Foundation, 1943. 262 pp.

1941-1942 REPORT OF THE NEW YORK STATE COMMISSION TO FORMULATE A LONG RANGE HEALTH PROGRAM. Health Preparedness Commission. Albany: Williams Press, 1943. 413 pp.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Health Insurance for Canada—Whole hearted endorsement of a really inclusive health insurance plan for Canada is given in two "submissions" by the Canadian Medical Association and the Canadian Public Health Association. The program is described in detail in an accompanying paper.

ANON. The Canadian Medical Association and Health Insurance (and) The Importance of Preventive Medicine and Public Health in National Health Insurance. *Canad. Pub. Health J.* 34, 7:299 (July), 1943.

"There Is a Harmony in Autumn"—In summer when the birth rate is highest, forces that tend to produce non-viable offspring are least active. Summer is the season when the best babies are born and (which is not the same thing) the best time for babies to be born, for infants that arrive during late spring and summer have a better chance to escape respiratory infections.

ANON. Summer Babies Are Best. *Stat. Bull. (Met. Life Ins. Co.)* 24, 6:3 (June), 1943.

Diphtheria Up—Diphtheria death rates were higher last year. Will the change in trend continue? How much is due to wartime conditions? The answers are not included with the tabulations.

ANON. Diphtheria Mortality in Large Cities of the United States in 1942. *J.A.M.A.* 122, 16:1079 (Aug. 14), 1943.

Fifty Had No Typhoid Deaths—Great improvement in typhoid fever rates is reported in this annual compilation. Evidently war travel and wartime crowding have not yet compli-

cated the typhoid problems of our large cities.

ANON. Typhoid in the Large Cities of the United States in 1942. *J.A.M.A.* 122, 17:1181 (Aug. 21), 1943.

Chest X-ray Faults—Arguments against mass radiography as a tuberculosis case finding measure, even poor ones, should be read by the proponents of this useful scheme. These are important.

BRAILS福德, J. F. Mass Miniature Photography of the Fluorescent Image: A Criticism. *Pub. Health.* 56, 10:117 (July), 1943.

If Children Need Not Have Caries—We do know, concludes this paper on an oral hygiene study conducted in Green Bay, Wis., that the dental caries experience is greatly lessened in those who have continuously used fluorine-containing water since birth. If we do know that, it would seem to be about time that we did something about it, would it not?

BULL, F. A. The Rôle of Fluorine in Dental Health. *J. Am. Dental Assoc.* 30, 15:1206 (Aug.), 1943.

TB and Hospitals—Routine x-rays in one hospital revealed that 4 per cent of the patients, who would not otherwise have been detected, had evidence of tuberculous infection. Public health implications are obvious.

CHILDRESS, W. G., *et al.* Tuberculosis Case Finding by General Hospitals. *J.A.M.A.* 122, 16:1063 (Aug. 14), 1943.

Will Socialized Medicine Be Extended?—In this corner, pro: in that

corner, con. Eleven desiderata are enumerated.

DAVISON, W. C. Should American Medicine Be Socialized? *J.A.M.A.* 122, 16:1067 (Aug. 14), 1943.

Saludos Amigos—Do you know about the "Cooperative Inter-American Public Health Service" and the inter-American battle for health? There are health stations on the Amazon, health projects in Ecuador, health centers in Paraguay, and across Central America. Here is an interesting story commended to all.

DREISBACH, A. Inter-American Health Program Goes Forward. *Pub. Health Nurs.* 35, 8:445 (Aug.), 1943.

In Place of Jails and Lock-ups—Mentally sick persons, who are not well-to-do, must in too many states lean upon the tender mercies of the poor officer or the sheriff. New York began the movement to put these unfortunates under the care of health officials. Eight other states have followed in this humanitarian trend, the latest Oregon. Details of the state procedures are recounted.

HAMILTON, S. W. The Health Officer's Place in the Management of Mental Illness. *Pub. Health Rep.* 58, 26:979 (June 25), 1943.

When Only the Toughest Survived—For sheer pleasure read this picture of public health sixty years ago, which centers about the neighborhood pump from which the Flexner boys, Simon and Abraham, and their seven brothers and sisters (and young Yandall Henderson) drank.

HENDERSON, Y. Recollections of a Street Corner Pump and the Progress of Sixty Years. *Science.* 96, 2532:26 (July 9), 1943.

Long Forward Step—Local post-graduate demonstration clinics and seminars to bring the essentials of mental health to practising physicians have been inaugurated promisingly as one

of the major activities of a state division of mental hygiene.

HAUGEN, G. B. An Approach to the Mental Hygiene-Public Health Problems. *Pub. Health Rep.* 58, 32:1211 (Aug. 6), 1943.

Public Health on Land and Sea and Air—Some of the things the 1,800 full-time medical officers of the U.S. P.H.S. are doing at the ends, as well as the middle of, and above the earth are recounted by the one man who knows most about their various activities.

PARRAN, T. The United States Public Health Service and the War. *J.A.M.A.* 122, 16:1092 (Aug. 14), 1943.

It's about Scarlet Fever—Some quaint, isolated villages in Magda ("Red Head") Lupescu's Rumania—hamlets free from scarlet fever but in an area surrounding an endemic focus—were selected for a study of the population during preëpidemic, epidemic, and post-epidemic stages. The report upon this study covers seventy pages. Approaching senility, the need of a summer vacation, and a reprehensible incuriosity about the subject, all combine to unfit this annotator to do more than remind you that this wealth of epidemiologic enlightenment knocks at your door for attention.

SCHWENTKER, F. F., *et al.* The Epidemiology of Scarlet Fever. *Am. J. Hyg.* 38, 1:27 (July), 1943.

Healthy Soldiers—In no month has the venereal rate in this country even approached the lowest monthly rate of the last wartime period. In general it may be said that the health of the army here and overseas is satisfactory. Statistics are presented to convince Doubting Thomas.

SIMMONS, J. S. The Present State of the Army's Health. *J.A.M.A.* 122, 14:916 (July 31), 1943.

Who Talked First and Why—Here ye'are! Read all about it! The

ding-dong, the bow-wow, the pooh-pooh, the yum-yum, and the babble-babble theories of speech beginnings. It isn't public hygiene but it's entertaining.

THORNDIKE, E. L. *The Origin of Language*. Science. 98, 2531:1 (July 2), 1943.

Radiant Disinfection of Air—Exploring the hypothesis that the spread of communicable disease depends upon deficiencies of the atmosphere, the authors present evidence to show that a tenfold increase in winter ventilation (or its equivalent in ultraviolet irradiation) does prevent the spread of air-borne contagion.

WELLS, W. F., and WELLS, M. W. *Dynamics of Air-Borne Infection*. Am. J. Med. Sci. 206, 1:11 (July), 1943.

Professional People Are Also Citizens—As it tosses out a bold challenge to the sanitary engineers to

look beyond their technology and to take part in finding political, legal, and fiscal answers to post-war problems, this sparkling address should be read and taken to heart by all the specialists in the broad field of public health.

WOLMAN, A. *The Post-war Rôle of the Sanitary Engineer*. Sewage Works J. 15, 3:445 (May), 1943.

Influencing Human Eating Habits—Food store sales of the protective foods were used as a measure of the effect of an educational project in nutrition carried on in one section of a city. Marked gains in sales of a greater number of the protective foods were reported in the experimental area than in the control region. The advantages and limitations of this measuring device are discussed.

YOUNG, A. *A Method for the Evaluation of a Community Nutrition Program*. J. Am. Dietet. A. 19, 6:420 (June), 1943.

ASSOCIATION NEWS

THREE-DAY WARTIME PUBLIC HEALTH CONFERENCE AND SEVENTY-SECOND ANNUAL BUSINESS MEETING AMERICAN PUBLIC HEALTH ASSOCIATION

New York, N. Y., October 12, 13, 14, 1943

Headquarters: Hotel Pennsylvania

RATES QUOTED BY NEW YORK HOTELS

*War-time Public Health Conference and Seventy-second Annual
Business Meeting—October 12-14, 1943*

| | Rooms With Bath | |
|---|-----------------|--------------|
| | Single | Double |
| Headquarters: | | |
| Hotel Pennsylvania, 7th Avenue and 33rd Street | \$3.85- 8.80 | \$5.50- 9.90 |
| Hotels near Hotel Pennsylvania: | | |
| Governor Clinton, 31st Street and 7th Avenue | 3.30- 5.50 | 4.40- 7.70 |
| McAlpin, Broadway and 34th Street | 3.30- 6.60 | 4.95- 8.80 |
| New Yorker, 34th Street and 8th Avenue | 3.85- 8.80 | 5.50-11.00 |
| Selected Hotels Outside Pennsylvania Zone: | | |
| Ambassador, Park Avenue and 51st Street | 5.00- 8.00 | 7.00-10.00 |
| Astor, Broadway and 44th Street | 3.00- 5.00 | 5.00- 8.00 |
| Barbizon (Women), Lexington Avenue and 63rd Street | 3.00- 3.50 | 4.50- 5.50 |
| Biltmore, Madison Avenue and 43rd Street | 5.50-12.00 | 7.50-14.00 |
| Bristol, 129 West 48th Street | 2.50- 4.00 | 3.50- 6.00 |
| Commodore, Lexington Avenue and 42nd Street | 3.50- 5.50 | 5.50- 8.80 |
| Cornish Arms, 311 West 23rd Street | 2.25- 2.50 | 3.50- 4.00 |
| Fifth Avenue Hotel, 24 Fifth Avenue (9th Street) | 3.75- 5.00 | 5.00- 7.00 |
| George Washington, 23rd Street and Lexington Avenue | 2.00- 4.00 | 3.50- 6.00 |
| Lexington, 48th Street and Lexington Avenue | 4.00- 6.00 | 5.50- 8.00 |
| Lincoln, 8th Avenue and 44th Street | 3.00- 5.00 | 4.00- 8.00 |
| Midston House, 22 East 38th Street | 3.00- 3.25 | 4.00- 4.50 |
| New Weston, Madison Avenue and 50th Street | 4.00- 6.00 | 6.00- 9.00 |
| Paramount, 46th Street, West of Broadway | 2.50- 4.50 | 4.00- 8.00 |
| Park Central, 7th Avenue and 55th Street | 4.00- 5.00 | 6.00- 7.00 |
| Parkside, 18 Gramercy Park South | 2.50- 3.00 | 5.00 |
| Piccadilly, 227 West 45th Street | 2.50- 4.00 | 3.50- 6.00 |
| Prince George, 14 East 28th Street | 2.50- 4.00 | 3.50- 7.00 |
| Roosevelt, Madison Avenue and 45th Street | 4.50- 8.00 | 6.50-12.00 |
| St. Regis, Fifth Avenue and 55th Street | 6.00- 7.00 | 7.00-11.00 |
| Seymour, 50 West 45th Street | 4.00- 5.00 | 5.50- 6.00 |
| Shelton, 49th Street and Lexington Avenue | 3.50- 5.00 | 5.00- 7.00 |
| Waldorf-Astoria, 50th Street and Park Avenue | 7.00-10.00 | 10.00-15.00 |
| Wellington, 7th Avenue and 55th Street | 2.50- 4.00 | 3.50- 6.00 |

MEETING OF THE COMMITTEE ON
PROFESSIONAL EDUCATION

The Professional Education Committee of the Association held a meeting in New York City on June 11 under the Chairmanship of William P. Shepard, M.D., of San Francisco. Important action of this session included a resolution concerning the emergency shortage of public health personnel. The committee invited Dr. Joseph W. Mountin, Assistant Surgeon General of the U. S. Public Health Service, Washington, for counsel regarding the acute shortage of personnel in all branches. Dr. Mountin pointed out that in many states federal grants-in-aid remain unexpended because the local health departments are unable to fill positions. The Service had advocated filling at least some of these positions with auxiliary personnel, but response to this method had so far not been encouraging. He expressed the opinion that there was no justification for allowing the level of health work to fall on the theory that we must maintain preconceived notions with respect to the qualifications of personnel. The seriousness of the situation was illustrated by several members of the committee who cited instances where sanitary sewage was seen running in open ditches through heavily populated streets, areas where there is a great lack of maternity care, and frequent attacks of gastroenteritis among travelers because of the overburdened food handling facilities. It was further pointed out that supervision of water and sewage treatment plants and of milk pasteurizing facilities have been notably weakened by the withdrawal of those trained and experienced in this work.

In responding to Dr. Mountin's request for the committee's aid in the solution of this problem, the committee asked that this subject be considered in the program of the Annual

Meeting and the Committee on Professional Education formulated a memorandum for publication in the *Journal* and general circularization, indicating its awareness of this problem and advocating certain steps to be taken in its solution (see page 920 of the July, 1943, *American Journal of Public Health*).

The Committee on Professional Education received a report from its subcommittee on Merit Systems indicating that definite progress had been made and that the committee was now prepared to offer and was offering examinations for all classes of public health nurses and for most classes of medical health officers. The preparation of material for examinations of laboratory personnel was shortly to be undertaken.

The committee received and approved for publication a report on the Educational qualifications of Public Health Laboratory Workers (see page 882 in the July, 1943, *American Journal of Public Health*).

Similarly, a report on the Educational Qualifications of Health Educators was approved for publication (see page 998 in the August, 1943, *American Journal of Public Health*).

The committee considered further a report on Educational Qualifications of Medical Administrators which will include workers in maternal and child health, in tuberculosis control, in venereal disease control, in cancer control, and in mental and industrial hygiene.

A report was received from a new subcommittee under the Chairmanship of George J. Nelbach, New York, N. Y., on the Educational Qualifications of Executive Secretaries of Voluntary Health Agencies. The report, in the form of a first draft, was received and ordered circulated.

Further consideration was given to a report on the Educational Qualifications of Public Health Dentists, and

consideration was given to revision of the existing report on the Educational Qualifications of Health Officers.

A summary was presented of a preliminary report on the Educational Qualifications of School Physicians which has been prepared under the Chairmanship of C. C. Wilson, M.D., of New York, N. Y.

Progress reports were received by the committee on the Educational Qualifications of Professional Personnel in Sanitation, on the Qualifications of Public Health Nurses, of Public Health Nutritionists, and of Public Health Statisticians.

On the recommendation of Henry F. Vaughan, Dr.P.H., Referee, it was voted to defer action on the preparation of a report on crippled children's specialists for the present.

The Committee on Professional Education considered a request from the American Association of Colleges of Pharmacy that the A.P.H.A. define the position of pharmacy among the public health professions.

Further consideration was given to a resolution regarding levels of compensation commensurate with professional qualifications.

The Committee on Professional Education considered a possible survey of the field of graduate education in public health and voted to continue the present liaison with the Council on Medical Education and Hospitals of the American Medical Association. It was the opinion of the committee that steps should be taken immediately to secure a greater uniformity in graduate degrees in public health. Attention was called to the fact that during the academic year 1941-1942, 27 different public health degrees were granted. Inquiry was made of the Association of Schools of Public Health as to steps that were being taken to correct this situation. The committee also considered the possible certification of schools of public health.

ISABEL B. LANDY

Associate Secretary

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Vernon F. Anderson, M.D., D.P.H., Government Medical Service, Belize, British Honduras, Senior Medical Officer

Francis H. Cole, M.D., Memphis and Shelby County Health Dept., Oakville, Tenn., Director, Div. of Tuberculosis Control

C. J. Fisher, M.D., M.P.H., City Hall Bldg., Tuscaloosa, Ala., Tuscaloosa County Health Officer

Frank F. Furstenberg, M.D., Bay Area Health Center, Valparaiso, Fla., P.A. Surgeon (R), U. S. Public Health Service and Physician, State Health Dept.

Dr. G. Harold K. Gentle, M.P.H., St. Georges, Grenada, British West Indies, Medical Officer in charge of Health Centers

Gunnar Gundersen, M.D., 1836 South Avenue,

LaCrosse, Wis., Member, State Board of Health

Clarence E. Houston, City Bldg., Washington, Pa., City Health Officer

Benjamin Ron Monroy, Av. Mexico No. 328, Tepic, Nay, Mexico, State Health Commissioner, Federal Dept. of Health

James P. Moon, M.D., 44 Vine St., Winchester, Tenn., Director, Franklin and Coffee County Health Dept.

Fritz Plotke, M.D., M.P.H., State Hospital, Chicago, Ill., Public Health Adviser, State Dept. of Public Welfare

Joseph J. Saia M.D., Hoopa General Hospital, Hoopa, Calif., Physician, Senior Grade, U. S. Indian Service

Alice M. Waterhouse, M.D., 3557 86th St., Jackson Heights, L. I., N. Y., Junior Health Officer, New York City Dept. of Health

Laboratory Section

- William F. Bloom, 224 81st St., Brooklyn, N. Y., Jr. Bacteriologist, Sea View Hospital
- Helen B. Brumbaugh, M.S., 4609 Bayard St., c/o Mrs. Price, Apt. 4, Pittsburgh, Pa., Serological Technician, Pittsburgh Public Health Lab.
- Margaret J. Carlson, 824 West Ionia, Lansing, Mich., Bacteriologist, State Dept. of Health Labs.
- Ivory L. Clinton, State Dept. of Health Lab., Lansing, Mich., Bacteriologist
- Adrien S. DuBois, Richards Chemical Works, 190 Warren St., Jersey City, N. J.
- Louis C. Felger, City Health Labs., San Antonio, Tex., Laboratory Director
- Kathleen L. Gay, P. O. Box 727, Selma, Ala., Assoc. Bacteriologist, State Dept. of Health Laboratories
- Lieut. Irving J. Greenblatt, Sn.C., Camp Stoneman Hospital, Calif., Asst. Chief, Laboratory Service, Army of U. S.
- Laura M. Huntley, 312 W. Grand River, East Lansing, Mich., Bacteriologist, State Dept. of Health
- Mildred Jefferies, State Dept. of Public Health, Montgomery, Ala., Assoc. Bacteriologist, Bureau of Labs.
- Arden H. Killinger, Ph.D., Parke, Davis & Co., Detroit, Mich., Sr. Research Virologist, Research and Biological Labs.
- Lieut. Peter J. Knaus, Sn.C., 4322 5th Ave., So., Minneapolis, Minn., Sanitary Officer, 279th Station Hospital, Camp Bowie, Tex.
- Major Clarence F. Nave, Sn.C., Station Hospital, Fort Benning, Ga., Asst. Chief of Laboratory Service
- Harry Pearse, M.S., State Sanatorium, Wal-lum Lake, R. I., Laboratory Director
- Lieut. William S. Proudfit, Sn.C., 320 South 15th, Lincoln, Nebr., Sr. Bacteriologist, State Health Dept.
- Hermann Sommer, Ph.D., Hooper Foundation, U. C. Medical Center, San Francisco, Calif., Asst. Professor of Medical Research
- James L. Terrell, 4080 Detroit St., Beaumont, Tex., Director, Jefferson County Health Unit Laboratory
- Mae L. Watts, M.S., 406 No. Ardmore Ave., Los Angeles, Calif., Bacteriologist, State Dept. of Public Health
- Paul A. Wolf, Ph.D., 2010 Ashman St., Midland, Mich., Biochemist, Dow Chemical Co.

Vital Statistics Section

- Mary C. Macdonald, 156 Allen Place, Hartford, Conn., Secty. of Tumor Record Registry, Cancer, Div., State Dept. of Health

Engineering Section

- Leon S. Blankenship, 2736 E. Magnolia Ave.,

Knoxville, Tenn., Director, Div. of Sanitation, Knoxville-Knox County Health Dept.

- Charles E. Cotton, Jr., District Health Unit, Twin Falls, Ida., Milk Sanitarian, State Dept. of Public Health
- Vernon P. Crockett, 603 BMA Bldg., Kansas City, 8, Mo., Asst. Engineer (R), U. S. Public Health Service
- Morton S. Hilbert, 818 John St., Apt. 1, Sault Ste. Marie, Mich., Sanitary Engineer, Chippewa County Health Dept.
- Ladislaus T. Jodaitis, 458 State Office Bldg., Madison, Wis., Asst. Engineer (R) U. S. Public Health Service, (Assigned to State Board of Health)
- James A. King, Jr., 1613 Pineola Ave., Kingsport, Tenn., Actg. Jr. Sanitation Consultant, Sullivan County Health Dept.
- Capt. Wilburn H. Kittrell, Sn.C., New Orleans Staging Area, New Orleans, La., Survey Unit, Army of the U. S.
- William B. Schreeder, Box 58, LaFayette, Ga., Public Health Engineer, Walker County Health Dept.
- Charles T. Starkey, State Board of Health, Houston, Miss., District Milk Sanitarian
- Norman S. Stearns, 16 Fuller St., Brookline, Mass., Sr. Sanitary Engineering Aide, State Dept. of Public Health
- Rulon S. Tueller, Bannock County Health Unit, Pocatello, Ida., Sanitarian
- Leonard P. White, Basement, City Hall, Houston, Tex., Sanitary Engineer, Water Div., Utilities Dept.
- Charles L. Wood, Box 175, Marlboro, Md., Sanitary Engineer, State Health Dept.

Industrial Hygiene Section

- Bruno Allary, M.D., D.P.H., Roberval, P.Q., Quebec, Canada, Medical Officer of Health
- Mary Grebas, R.N., 3501 Garrison Blvd., Baltimore, 15, Md., Industrial Nurse, Bendix Radio
- William Brice Pinder, East Bay St., Nassau, Bahamas, Member, Board of Health

Food and Nutrition Section

- Richmond K. Anderson, M.D., Calle Viena, 26, Mexico, D. F., Mexico, Staff Member, International Health Div., Rockefeller Foundation
- W. Hazel Bean, M.S., Reg. Office, State Health Dept., Jackson, Tenn., Regional Nutrition Consultant
- Lola T. Dudgeon, M.S., University of Arizona, Tucson, Ariz., Extension Nutritionist
- Henry R. Kraybill, Ph.D., 59 East Van Buren, Chicago, Ill., Director, Dept. of Scientific Research, American Meat Inst.
- Leslie J. Rosenberg, 4014 Kansas Ave., N.W.,

Washington, D. C., Food Inspector and Bacteriologist, D. of C. Health Dept.

Maternal and Child Health Section

- Robert J. O'Neil, D.M.D., 1208 Faithful St., Victoria, B. C., Canada, Provincial Clinician, B. C. Dept. of Health
Ruth Tartakoff, M.S., Childrens Bureau, U. S. Dept. of Labor, Washington, D. C., Regional Medical Social Consultant
Mildred Van Cleve, M.D., 4509 Edgewood Place, Riverside, Calif., Pediatrician, State Dept. of Public Health

Public Health Education Section

- George R. Bedinger, M.A., 2944 Macomb St., N.W., Washington, D. C., Chief, Health and Sanitation Section, Federal Public Housing Authority
Leon M. Childers, D.D.S., Manhattan Beach Coast Guard Sta., Brooklyn, N. Y., P.A. Dental Surgeon (R), U. S. Public Health Service
Mary L. Gladish, 262 Pulaski St., Lawrenceburg, Tenn., Student, Univ. of North Carolina, School of Public Health
Sister Marie B. Masterson, 8200 W. Outer Dr., Detroit, Mich., Sisters of Mercy, Hospital Division
Joseph J. Obst, D.D.S., 798 E. 34th St., Brooklyn, 10, N. Y., Dentist
Julius A. Olean, M.D., P. O. Box 553, Midland, Tex., Director, Midland-Ector-Howard County Health Unit
M. Virginia Parsons, R.N., P. O. Box 547, Savannah, Ga., Assoc. Health Education Consultant, U. S. Public Health Service
Ruth D. Rains, 1014 Monroe St., Charleston, Ill., Student of Public Health Education, Univ. of North Carolina
Lucretia A. Saunders, 520 E. 54th St., Indianapolis, Ind., Public Health Educator, State Board of Health
Gordon H. Sears, M.A., 9108 Burning Tree Rd., Bethesda, 14, Md., Medical Care Adviser, U. S. Public Health Service
Agnes H. Thomson, 128 Spadina Rd., Toronto, Ont., Canada, Medical Officer, Provincial Dept of Health
Lieut. Julius H. Winer, M.C., 480 Lexington Ave., New York, 17, N. Y. Chief of Urological and Laboratory Dept., Armed Forces Induction Station
William E. Woods, Driskill Hotel, Austin, Tex., Health Education Consultant, State Health Dept.

Public Health Nursing Section

- Marie R. Audet, R.N., 120 Grande Allee, Quebec, P. Q., Canada, Social Service

Worker, Div. of Venereal Diseases, Ministry of Health

- Francis Frazier, R.N., 706 Huntington Ave., Boston, Mass., Student, Harvard School of Public Health
Edith Hetteima, City Health Dept., Portsmouth, Va., Venereal Disease Control Nurse
Ida McRoberts R.N., M.A., 131 S. Barry St., Olean, N. Y., Supervising Nurse, Cattaraugus County Dept. of Health
Della M. Poe, 210 E. Kathleen, Sikeston, Mo., Senior Nurse, Southeast Missouri Health Service, Inc.
Esther Porter, 829 Hampton Ave., Toledo, Ohio, Asst. Director of Nurses, City Board of Health
Ethelwyn H. Saxild, R.N., City Hall, Richmond, Calif., Supervisor of Public Health Nursing, Richmond Health Dept.
Mildred Tuttle, M.S., 216 N. Mulberry, Marshall, Mich., Consultant in Nursing Education, W. K. Kellogg Foundation

Epidemiology Section

- J. Franklin McVeigh, M.D., M.P.H., 204 Plymouth Ave., S., Rochester, N. Y., Asst. District Health Officer, State Health Dept.
Elsmere R. Rickard, M.D., M.P.H., State Dept. of Health, Univ. Campus, Minneapolis, Minn., Director, Influenza Laboratory

School Health Section

- Lewis S. Harris, Sr. High School, Orchard St., Belmont, Mass., Director, Dept. of Health and Physical Education, Belmont Schools
Esther T. Melrose, R.N., 1005½ W. Mullen, Waterloo, Iowa, School Nurse, Waterloo Public Schools

Unaffiliated

- William T. Clark, M.D., 317 Hayes Bldg., Janesville, Wis., Member, State Board of Health
Capt. Harold M. Deane, V.C., APO 862, Postmaster, New York, N. Y., Veterinary Corps, U. S. Army
Stephen E. Gavin, M.D., 104 S. Main St., Fond du Lac, Wis., Member, State Board of Health
Lillian D. Long, Ph.D., 40 W. 67th St., New York, N. Y., Psychometrician, Merit System Study, American Public Health Assn.
Albert E. Rector, M.D., 103 W. College Ave., Appleton, Wis., Member, State Board of Health
Hildegard Wagner, 340 E. 52nd St., Apt. 3D, New York, 22, N. Y., Field Director, Local Health Preparedness Committees, New

York State Health Preparedness Commission

Harrison A. Walker, M.D., 735 Penn Ave., N.E., Atlanta, Ga., Senior Surgeon (R), U. S. Public Health Service and Regional Medical Officer, Office of Civilian Defense

DECEASED MEMBERS

John W. Alvord, Chicago, Ill., Elected Member 1899, Charter Fellow 1922, Engineering Section

A. T. McCormack, M.D., Louisville, Ky., Elected Member 1919, Charter Fellow 1923

Orville H. Brown, M.D., Arcadia, Calif., Elected Member 1937

Leo F. Hall, M.D., Helena, Mont., Elected Member 1920

WILLIAM J. RYAN, M.D., Pomona, N. Y., Elected Member 1934, Maternal and Child Health Section

LESLIE T. WEBSTER, M.D., New York, N. Y., Elected Member 1935, Elected Fellow 1940, Epidemiology Section

ROBERT S. WESTON, Boston, Mass., Elected Member 1896, Charter Fellow 1922, 40 year member, 1938, Engineering Section

CORRECTION

On page 893 of the *Journal* for July, there is an outline of Bristol's method of treating verminous heads. It is stated in the item that lethane is a derivative of arsenic preparations. This is an error. Lathane 384 Special, according to the manufacturers, Rohm & Haas Company, Philadelphia, Pa., is a synthetic organic chemical product widely used as an insecticidal agent in household and industrial sprays. It contains no arsenic nor is any arsenic compound used in the process of its manufacture.

Further references to the use of this

method for controlling the head louse can be found in the *British Medical Journal*, April 11, 1942, volume 1, page 464, and in a memorandum on Control of Head Lice issued in 1943 by the British Ministry of Health, No. 230A.

JOURNALS URGENTLY NEEDED

It will be much appreciated if readers will send spare copies of the July, 1941, January, 1942, January, 1943, and March, 1943, issues of the *American Journal of Public Health* to the Stock Clerk, American Public Health Association, 1790 Broadway, New York 19, N. Y.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.

POSITIONS AVAILABLE

CAREER OPPORTUNITIES IN PENNSYLVANIA

Charles B. Frasher, Merit System Supervisor, Pennsylvania State Department of Health, 207 Blackstone Building, Harrisburg, announces that appointments will soon be made in the following branches of the State Health Department of Pennsylvania: Health Conservation, Tuberculosis Control, Venereal Disease Control, Pneumonia Control, Industrial Hygiene, Narcotic Drug Control, Environmental Hygiene, Public Health Laboratories, Maternal and Child Health Services, Crippled Children's Services, School Medical Inspection, Dental, Nutrition, Milk Sanitation, Public Health Education, Sanitary Engineering, Vital Statistics, Public Health Nursing, Accounts, Biologicals and Supplies, Merit System, Tuberculosis Sanatoria. Open competitive examinations will be held and the resulting lists are expected to be in existence for 2 years or longer. Residence requirements are waived for professional positions.

THE MERIT SYSTEM COUNCIL OF WEST VIRGINIA ANNOUNCES EXAMINATIONS FOR THE FOLLOWING POSITIONS IN THE WEST VIRGINIA STATE HEALTH DEPARTMENT

| <i>Position</i> | <i>Salary</i> |
|--------------------------------------|-----------------|
| Public Health Nurse (Class A) | \$1,680-\$1,980 |
| Public Health Nurse (Class B) | 1,500-1,860 |
| Public Health Nurse Trainee | 1,380-1,500 |
| Graduate Nurse | 1,380-1,620 |
| Junior Engineer | 2,160-2,640 |
| Chemist | 1,620-2,100 |
| Sanitarian | 1,500-2,100 |
| Sanitarian Trainee | 1,200-1,500 |
| Junior Bacteriologist | 1,920-2,400 |
| Junior Serologist | 1,920-2,400 |
| Technical Laboratory Assistant | 1,500-2,100 |

Age limits and residence in West Virginia have been waived in consideration of applicants for these positions. Appointments may also be made at a salary above the minimum. Applications will be ac-

cepted continuously and examinations given whenever enough applications are filed to assure adequate competition. Persons interested should make application to the Merit System Council, 212 Atlas Building, Charleston, W. Va.

Announcement is made of the following examinations to be held by the State Personnel Board, Seattle, Wash., for positions in the State Department of Health and County Health Departments:

| <i>Position</i> | <i>Salary Range</i> <i>Entrance Maximum</i> | |
|---|--|-------|
| Bacteriologist B | \$160 | \$190 |
| Laboratory Helper D.. | 120 | 140 |
| Laboratory Assistant C | 140 | 160 |
| Laboratory Technician | 140 | 170 |
| District Public Health Officer V | 380 | 440 |
| Public Health Nurse B | 160 | 190 |
| Asst. Venereal Disease Investigator B | 160 | 190 |
| General Sanitarian A .. | 190 | 220 |
| Milk Sanitarian A | 190 | 220 |
| Chief of Public Health Education | 280 | 320 |
| Senior Milk Sanitarian.. | 220 | 250 |
| Obstetric Consultant VI | 440 | 500 |
| Pediatric Consultant VI | 440 | 500 |
| Senior Bacteriologist A | 190 | 220 |

Council of Social Agencies in large Midwestern city is seeking person to fill position of assistant secretary in its health division. Responsibilities include coördinating, planning, and promoting of adequate community health services. Involves working with medical and health agencies and organizations and with committees. Beginning salary \$3,000. Applications should indicate training and experience and references. Box R, Employment Service, A.P.H.A.

Wanted: Two physicians, immediate appointment, full-time venereal disease clinician, conduct several small clinics rotating schedule. Experience preferred.

Salary \$3,600 plus actual expense not to exceed \$1,200. Write State Health Department, Santa Fe, New Mexico.

Wanted: Laboratory technician, tuberculosis hospital. 130-150 beds. Salary \$175 per month and full maintenance. Opportunity to do research. Nice surroundings, good living quarters. Write Dr. Paul D. Crimm, Boehne Hospital, Evansville, Ind.

Physician—public health pediatrics. To assist director of maternal and child health in large California County Health Department. Major duties, conducting of infant and preschool health conferences and school examinations. Beginning salary \$350 and travel allowance. California license required. Training and experience in pediatrics or public health or both. Immediately available. Address William C. Buss, M.D., Kern County Health Department, Bakersfield, Calif.

Wanted: A physician trained in tuberculosis to assume administrative control of the Bureau of Tuberculosis in an eastern city of 200,000 population. Salary \$3,900-\$4,500 plus cost of living adjustment. Address Box B, Employment Service, A.P.H.A.

Sanitarian wanted: Preferably with Bachelor's degree or engineering degree, plus public health experience or training. Must have own car. Applicant with lower qualifications will be offered an opportunity to take a short, free indoctrination course. Salary \$1,920 per year with travel allowance of \$50 per month, if qualified. Apply Dist. Dept. of Health No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Tuberculosis Association in large eastern city will accept applications for position on staff as statistical research secretary. Requirements: basic training in vital statistics, ability to plan and carry out statistical studies in the field of public health. One month's vacation. Five day week, with occasional work on Saturdays. Address Box C, Employment Service, A.P.H.A.

Wanted: Pediatrician to supervise medical care of children at cerebral palsy center being established by private institution in coöperation with Illinois Division of Services for Crippled Children. Salary commensurate with experience and training. For further information write Lawrence J. Linck, Director, Division of Services for Crippled Children, 1105 So. Sixth St., Springfield, Ill.

Wanted: Competent, thoroughly trained bacteriologist, woman or draft exempt man to take complete charge of splendidly equipped small industrial laboratory. Connecticut location, country environment, pleasant surroundings, excellent working and living conditions. Must have Ph.D. training or equivalent. Apply Box D, Employment Service, A.P.H.A.

Merit System for Personnel Administration in Delaware will set examinations for 3 positions in the Delaware State Board of Health shortly. The positions open for examination, together with the beginning salaries, are: Deputy State (County) Health Officer (\$3,800), Pediatrician (\$3,600), and Medical Social Consultant (\$2,400).

These examinations will be unassembled, but successful candidates will be expected to appear in Delaware for an oral interview which will be a weighted part of the examination. Appointments may be expected soon after the examinations are conducted.

Information and specifications as prepared for each position may be secured by communication with the Merit System Supervisor, P. O. Box 1911, Wilmington, Del., and application for examination must be made on the official form.

The Department of Health, New Jersey, whose industrial health activities have expanded rapidly during the present war, has announced its need for two full-time industrial hygiene physicians for its Industrial Hygiene Service. As one of the leading states in the production of war materials, New Jersey offers unusual opportunities for gaining experience in occupational disease control besides giving the physician a chance to make a valuable contribution to the war effort. The principal duties of the selected physicians will be consultations in regard to the following: control of occupational diseases; industrial toxicological problems; evaluation of adequacy of plant medical services; promotion of measures which will reduce absenteeism from non-occupational causes; and conduct of industrial health education activities. Physicians interested in these positions should write to the Department of Health, Trenton, N. J.

The Milwaukee Health Department is interested in obtaining an instructor in hospital nursing to conduct a student educational program in its communicable disease hospital. Salary offered begins at \$125 per month with maintenance, and increases of \$5.00 per month each year until \$135 has been reached. To this

basic salary there has been added a cost of living bonus of \$30.64 per month, making the total beginning salary \$155.64 plus maintenance. Apply to Dr. G. F. Burgardt, Deputy Commissioner of Health, Milwaukee, Wis.

Wanted: Woman bacteriologist for midwestern research organization. Industrial experience not necessary. Applicant should have had basic training in bacteriology. Apply Box P, Employment Service, A.P.H.A.

Wanted: Public health physicians in Texas. George W. Cox, M.D., State Health Officer, Austin, Tex.

Wanted: Public health statistician for large California County Health Department. College degree with training in statistics. Salary \$200. Position open. Address William C Buss, M.D., Kern County Health Department, Bakersfield, Calif.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK 19, N. Y.

In view of the current active demand for trained and experienced persons in public health it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. A-505

Woman physician, well prepared in pediatrics, M.S.P.H. DeLamar Institute, Columbia University. 1943, seeks employ-

ment in the field of maternal and child health, preferably administrative in pediatrics. Excellent references. A-507

Physician. M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as city or county health officer or director of a bureau. A-506

NEWS FROM THE FIELD

NEW APPOINTMENTS TO STAFF OF THE CHILDREN'S BUREAU

Alice Brackett has been appointed as assistant director of the nursing unit in the Division of Health Services of the Children's Bureau. Since October 1, 1939, she has been regional consultant nurse for the Children's Bureau in San Francisco.

Joy B. Stuart has succeeded Miss Brackett as regional consultant nurse in the San Francisco office. Miss Stuart was consultant nurse in maternal and child health in the State Department of Health in Utah for several years and recently organized the nursing services of the War Relocation Authority.

Lucile Perozzi, former director of public health nursing in the State of Oregon, has been appointed as regional consultant nurse for the Children's Bureau in the Midwest area.

Ruth Doran, former regional consultant nurse for the Children's Bureau in the Southern area, has been appointed as consultant nurse in maternal and child health and nurse midwifery.

Hattie Hemschemeyer, assistant director of Maternity Center Association, New York, N. Y., and lecturer in nursing education at Teachers College, has been appointed as part-time consultant to the Children's Bureau in special problems of maternity nursing and nurse midwifery.

NEW YORK CITY CERTIFIED MILK TO BE PASTEURIZED

The New York City Board of Health recently passed the following amendment to Section 156 of the city Sanitary Code restricting the sale of raw certified milk and of certified raw milk products to persons presenting a phy-

sician's prescription. The new regulation will become effective January 1, 1944.

"Regulation 15. Sale of certified milk, skimmed milk or cream (raw) on physician's prescription only. No certified milk, skimmed milk or cream, other than 'Certified Milk (Pasteurized),' 'Certified Skimmed Milk (Pasteurized),' or 'Certified Cream (Pasteurized),' shall be sold or distributed in the City of New York except in those cases where a physician's statement, prescribing unpasteurized (raw) certified milk, skimmed milk or cream, is filed by the purchaser with the milk dealer. The physician's statement shall bear the date of issuance, the name and address of the consumer and shall be valid for one year from the date of issuance. Such statement shall be kept on file by the milk dealer and shall be open at all times to inspection by a representative of the Department of Health."

Health News, New York State Dept. of Health, 20, 30 (July 26), 1943.

DR. BLACKERBY APPOINTED KENTUCKY STATE HEALTH COMMISSIONER

The Kentucky State Board of Health has announced the election of Philip Earle Blackerby, M.D., who has served for years as Assistant State Health Commissioner, to the position of Secretary and State Health Commissioner to succeed Arthur T. McCormack, M.D., who died on August 7. Dr. Blackerby is a graduate of the University of Louisville School of Medicine in 1904. He joined the American Public Health Association in 1933 and is associated with the Health Officers Section.

DR. HUTCHESON APPOINTED COMMISSIONER OF HEALTH IN TENNESSEE

R. H. Hutcheson, M.D., who has served for some years as Assistant Commissioner of Health in Tennessee, was recently appointed Commissioner of Health by Governor Prentice Cooper,

succeeding W. Carter Williams, M.D., who has been called to military duty and commissioned a Lieutenant Colonel in the Medical Corps of the U. S. Army.

Dr. Hutcheson is a graduate of the University of Tennessee, M.D., 1930, and received his C.P.H. from Johns Hopkins School of Hygiene and Public Health in 1934.

MARYLAND STATE COURT OF APPEALS
SUPPORTS BALTIMORE CITY
HOUSING ORDINANCE

The Maryland Court of Appeals recently handed down a decision approving the constitutionality of Baltimore's health ordinance relating to housing. The ordinance was passed in 1941, according to the *Baltimore Sun*, in response to a strong public sense of outrage against slum conditions in Baltimore, and was designed to strengthen the hand of the Health Department in enforcing minimum housing standards. A case under the law was appealed on the ground that the ordinance was unconstitutional and gave illegal power to the Health Commissioner.

In its decision the Court of Appeals declared that "The only purpose of the ordinance is to protect and preserve the health of the people of Baltimore," and that "the city has the power under its charter to preserve the health of the city and to prevent and remove nuisances. The exercise of charter powers by a city is not discretionary but is a duty."

Baltimore Health News for August publishes the decision in full.

ROYAL COLLEGE OF PHYSICIANS ELECTS
MEDICAL OFFICERS OF HEALTH TO
FELLOWSHIP

Announcement recently has been made that the Royal College of Physicians in London has elected to Fellowship Dr. James Macintosh of Glasgow, Dr. Robert Hughes Parry of Bristol, and Dr. John E. Gordon, Professor of

Preventive Medicine and Public Health at Harvard University Medical School, Boston, Mass. This recognition of health workers with Fellowships is said to be extraordinary in the history of the Royal College.

PERSONNEL CHANGES IN THE TERRITORIAL BOARD OF HEALTH, HONOLULU

As of June 5, 1943, Dr. Marion F. Haralson of the staff of the U. S. Public Health Service, who had been Commissioner of Public Health, was transferred from Honolulu, and on June 25 Charles L. Wilbar, Jr., M.D., was appointed to succeed him. A recent session of the Territorial Legislature has changed the title of the position from Commissioner of Public Health to President of the Board of Health.

Dr. Wilbar was released from active duty as a Major in the Medical Corps of the U. S. Army to accept this position. Previous to entrance into the Army he was Director of the Bureau of Maternal and Child Health of the Territorial Board of Health.

During the interim Richard K. C. Lee, M.D., Deputy Commissioner of Public Health, was in temporary charge of the department. He now serves as executive officer under Dr. Wilbar.

SOUTHERN BRANCH, A.P.H.A.

The Southern Branch of the American Public Health Association will have no formal meeting in 1943, but will have a meeting of the officers of the Association and the Governing Council.

CORRECTION

In the report "Check Anthrax" in the July *Journal*, page 855, it was erroneously stated that "it is regrettable that the U. S. Public Health Service has ceased to make anthrax in this country reportable to them." The facts are that detailed case records are no longer required, but weekly numerical reports are still received from the

states. The impression of certain individuals, referred to on page 856, that anthrax was no longer a particular hazard, grew rather from the fact that Department of Agriculture regulations regarding the importation and treatment of animal by-products, designed to prevent the dissemination of anthrax, were discontinued in 1940.

COURTENAY DINWIDDIE DIES

Courtenay Dinwiddie, sociologist and general secretary of the National Child Labor Committee, died September 13 in New York of a heart attack at the age of 60. Formerly director of health programs under the American Child Health Association and under the Commonwealth Fund, Mr. Dinwiddie was also consultant on child hygiene for the New York City Department of Health and at one time a teacher of community organization at Johns Hopkins University. He has been a member of the A.P.H.A. since 1916 and a Fellow since 1922.

PERSONALS

Central States

ERWIN C. CARY, M.D., of Reedsville, Wisc., has been reappointed Health Officer for the Village of Reedsville and also for the towns of Rockland and Franklin. He was recently re-elected President of the Manitowoc County Health Officers' Association.

VIDA H. GORDON, M.D., M.P.H.,† Director of the Sanilac County (Mich.) Health Department since June, 1941, has been appointed Director of Crippled Children Activities in Arkansas, with headquarters in Little Rock. Dr. Gordon was recently elected President of the Sanilac County Medical Society.

WILLIAM T. GROVE, M.D., of Eureka, Kans., has been appointed Health Officer of Greenwood County, to succeed WALTER S. MOONLIGHT, M.D., of Eureka, resigned.

ALICE M. HEATH, C.P.H.,† formerly Health Education Consultant for the Wisconsin Anti-Tuberculosis Association, has accepted a position as Director of Health Education of the Peoria County Tuberculosis Association, Peoria, Ill.

SAMUEL N. MALLISON, M.D.,† of El Dorado, Kans., has resigned as Health Officer of Butler County, to become Superintendent of the Southern Illinois Health District with offices in Harrisburg, Ill.

Eastern States

MARY M. ATCHISON, M.D., M.P.H.,† of Concord, N. H., has been appointed Acting State Health Officer of the State Department of Health of New Hampshire, to act during the leave of ALFRED LEO FRECHETTE, M.D., M.P.H.,† State Health Officer.

AMELIA H. GRANT, R.N., who has been Director of the Bureau of Nursing in the New York City Department of Health since 1928, retired recently. Commissioner E. L. Stebbins stated that no successor has yet been named. Miss Grant has been associated with the Henry Street Visiting Nurse Service, with the Department of Nursing Education at Teachers College, Columbia University, with the Yale School of Nursing, New Haven, and the Bellevue-Yorkville Health Demonstration. Miss Grant has twice been President of the N.O.P.H.N.

ROSE KOSHETZ† (M.S. in public health, Yale, 1928) has enlisted in the U. S. Army and after completing officer training expects to receive a commission. She has enlisted for overseas service and expects to return to the Middle East where she spent four years working as a dietitian in a large hospital in Palestine.

* Fellow A.P.H.A.

† Member A.P.H.A.

FREDERIC W. NORDSICK,* who for 5 years has been associated with the American Institute of Baking, New York, N. Y., has resigned to accept an appointment in the Department of Applied Research of Standard Brands, Inc., at the home office, New York City.

ANTHONY J. SPARTA, M.D., has been named Health Officer of Easton, Pa., succeeding the late REUBEN S. RAUB, M.D., who died May 28.

DONALD K. TRESSLER, PH.D.,* since 1933 Chief of Research and head of the Division of Chemistry, New York State Agricultural Experiment Station, Geneva, N. Y., has joined the staff of the General Electric Company. He will be concerned chiefly with research on refrigeration and the freezing preservation of foods, working in the laboratories at Bridgeport, Conn.

HELEN M. WALLACE, M.D., M.P.H., who completed the course at the Harvard School of Public Health in May, has been appointed Junior Health Officer in the New York City Department of Health.

Southern States

MARYLAND E. B. BYRNE, M.D., has been appointed Director of Maternal and Child Health of the Dade County Health Unit, Miami, Fla.

TURNER E. CATO, M.D.,† has been appointed Director of the Dade County Health Unit, Miami, Fla., following the recent resignation of THOMAS H. D. GRIFFITTS, M.D., D.P.H.†

ELIZABETH HARVEY, of Silver Springs, Md., has been appointed Health Secretary to the Council of Social Agencies of Washington, D. C. and vicinity, effective September 15.

GLEN J. HOPKINS,† formerly Assistant Public Health Engineer of the Mis-

souri State Health Department, has been commissioned as Past Assistant Engineer of the U. S. Public Health Service Reserve, and has been assigned to the South Dakota State Health Department as Director of the Division of Public Health Engineering. Mr. Hopkins also served as Secretary of the Missouri Public Health Association, and his successor as Secretary of this A.P.H.A. affiliated society is J. WARREN SMITH, Assistant Public Health Engineer, State Health Department, Jefferson City, Mo.

GORDON E. MCCALLUM,† Sanitary Engineer, U. S. Public Health Service, who has been Acting Chief of the Sanitary Engineering Section of the Medical Division of the Office of Civilian Defense since January, 1943, has been designated Chief Sanitary Engineer in charge of the Section. Mr. McCallum was assigned to the Medical Division in 1941 as Regional Sanitary Engineer for the Third Civilian Defense Region (Maryland, Virginia, Pennsylvania, and the District of Columbia) and the States of Ohio and West Virginia, and later was made Assistant Chief Sanitary Engineer.

HARCOURT A. MORGAN, JR., M.D.,† of Lewisburg, Tenn., head of the Bedford County Health Unit, has been placed in charge of a seven county area including the six adjacent counties of Grundy, Franklin, Warren, Bedford, Marshall, Moore, and Coffee, with headquarters at Manchester, Tenn.

JOHN E. OFFNER, M.D., of Weston, W. Va., was recently appointed State Health Commissioner.

B. M. PRIMER, M.D., M.P.H.,* formerly Health Officer in the Amarillo, Tex., Department of Health, is now Lieutenant Colonel, M.C., U.S.A., and is Commanding Officer of the

* Fellow A.P.H.A.

† Member A.P.H.A.

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Immediate Wartime Outlook and Indicated Post-War Conditions with Respect to the Control of the Venereal Diseases*

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I WISH to refer to what has been accomplished in venereal disease control in the Army since mobilization, mention briefly the tasks that lie immediately ahead, and then discuss some of the things we have learned that might with profit be carried over into the post-war management of this problem.

In general, the venereal disease situation in the Army has steadily improved since the first months of mobilization. The venereal disease rate for 1940 was 42.5 per 1,000. While current rates are not entirely comparable because of certain changes in administrative procedure, the rates for the past few months for infections acquired after entry into the service have been in the neighborhood of 25 per 1,000 per year. The syphilis rate has been under 5. When

these rates are further computed according to race, age, and sex they appear to be no higher than the attack rates for comparable groups of civilians during the past decade. In other words, there is no evidence that a young man in the Army today stationed in the Continental United States is subjected to a higher risk of venereal infection than he would be as a civilian.

Even more striking, and perhaps more significant, are the data on days lost from duty because of venereal disease. In 1940 each 1,000 men lost a total of 1,278 days; current rates are at a level of 368 days lost per year. For each million men under arms this represents a saving over the rate prevailing in 1940 in hospital costs alone of approximately \$4,000,000 each year—quite a saving considering the size of our present Army. Continuing advances in preventive measures, and in new methods of treatment, give promise

* Presented at a meeting of the New York State Committee on Tuberculosis and Public Health, June 3, 1943.

of further reducing the non-effective days.

Since October 1, 1942, through June, 1943, over 55,000 men infected with venereal disease as civilians have been taken into the Army, hospitalized until non-infectious, given adequate treatment under decent conditions, and turned over as functioning members of the Army. Over 20,000 of these have been individuals with syphilis.

Abroad, in some areas where there are large bodies of troops, the venereal disease rate has been very low; in other theaters of operation it has been high. The latter areas are receiving concentrated attention and we can only hope that our efforts will bear fruit.

The accomplishments thus far may be attributed we believe, to the recognition of venereal disease as primarily a medical problem, to the unflinching support of the control program by those in places of highest authority, and to the effective coöperation received from civilian authorities and community groups. I do not wish to give the impression that we are satisfied with the present situation. Indeed, the goal has been set at a level of rates much below those obtaining at present.

What tasks lie immediately before us?

First, we must afford protection to our troops abroad. I shall not dwell on this except to say that the problem is receiving close attention.

Second, much greater effort must be made by all concerned, both military and civilian, to bring the rate for Negro troops more in line with the rates for the Army as a whole. Recent experience indicates that this is not an impossible task.

Third, research—in the laboratory, in the hospital, in the field—must be pressed forward with all possible speed. Competent work is in progress under sponsorship of the Committee on Medical Research of the Office of Scientific Research and Development, on prophylaxis and on new therapeutic agents. We

need better epidemiological data and improved diagnostic tools.

Fourth, we must expand our educational efforts, particularly as directed to the young women of the community. Progress has been made in teaching the soldier to understand and avoid the hazards of venereal disease. The material assistance in this aspect of the program of the U. S. Public Health Service, the American Social Hygiene Association, many state health departments, and other groups is gratefully acknowledged. The responsible citizens of the community, too, are much better informed than they used to be. But this educational process is not reaching down to the young girls who are the companions of our soldiers. They give the impression of being sophisticated and knowledgeable in these matters, but actually they are sadly lacking in useful information.

We are often criticised on the grounds that instruction in sex hygiene and venereal diseases tends to lead to sexual promiscuity. I know of not the slightest evidence to support that view. Moreover, it is less than just to assume that fear of venereal disease is the principal reason that men and women adhere to the accepted moral code. We need not be afraid of the effects of knowledge concerning sex hygiene and venereal disease; for knowledge will carry with it an understanding and an orientation from which only good can flow. This is a job for all of us, the armed forces, health departments, and voluntary groups.

Fifth, the gains made against organized prostitution must be maintained. Prostitution is a hardy weed and constant attention is required to keep the gardens reasonably clean. It can be done only with and through the full support of the citizens of the community. Law enforcement and investigating machinery must be adequate of

course, but we have seen few communities that could not inaugurate and maintain a satisfactory program when the substantial citizens willed it so. It is not within my province to debate the moral issues involved, but it is my business to protect soldiers from venereal disease, and it has been amply demonstrated during this war period, if further evidence is necessary, that prostitution is a potent breeder of these diseases.

We have repeatedly to answer questions based on skepticism concerning the value of the repression program. Many worthy citizens believe that men must have prostitutes, that prostitutes can be made safe and sanitary by medical control, and that segregation and regulation rather than repression is the way to handle this problem. These beliefs are based on misinformation. It is not anticipated that prostitution will be wiped out any more than we expect that malaria will be eradicated in any foreseeable time, but it is certain that prostitution can be reduced in extent. To date the results have been far from discouraging and no one in authority would wish to return to the conditions that existed in many communities in the early days of mobilization.

There are numerous instances which lead one to believe that a more sensible approach is being made to the prostitution problem. While the prostitute herself is certainly not without blame, it is the third party in the boy-girl-facilitator combination that makes prostitution dangerous to the health of soldiers. It is a question of mathematics. A girl, regardless of how depraved her morals or how strong her desire for money, can expose relatively few soldiers without the aid, whether wittingly or not, of so-called facilitators, such as madams, taxi drivers, bellhops, proprietors and owners of cheap hotels and rooming houses. With the assistance of these facilitators, who are often

financially interested, she may have the opportunity of exposing many more individuals, thus greatly increasing the number of men subjected to the risk of infection. It is obvious that repressive measures should be directed to the apprehension of the facilitator, and not to the medically unprofitable activity of jailing prostitutes.

Finally, we are faced with the problem of the sexually delinquent young girl. This is not a prostitution problem and should not be confused with it. It is not even primarily a law enforcement problem, but a social and a medical one. I do not know the solution for it and I am not sure that anyone else does. But it is imperative that facts be accumulated quickly, in the hope that these might point the way to a more rational approach to the problem.

It is very disturbing to see misguided young girls, often bedraggled and undernourished, without family or friends, caught up in the prostitution repression program—jails and courts—when the whole situation might be handled by a stern father and a good doctor. Here is an opportunity for wise community leadership. The development of detention houses with facilities for medical treatment and possible rehabilitation is wholly sound. But something in addition is required. These girls need a flag around which to rally. They need to have some job to do and a feeling of personal responsibility toward the war effort. Possibly the expansion of community organizations of one sort or another to include these young girls in a democratic fashion may afford a partial answer. In any case, the energies of law enforcement personnel should not be diverted from the important and difficult job of the repression of true prostitution; that would please only those interests that profit from prostitution.

From this wartime experience in venereal disease control what lessons

are to be learned that may be useful when the time comes to reestablish our peacetime society? What new approaches to this old problem may be indicated in order to extend the civilian program so gallantly launched a few years ago?

First, I believe we should more fully exploit our medical resources in the attack on these diseases. No one will deny that moral factors play an influential rôle in the occurrence of syphilis and gonorrhea. But it is equally obvious that applications of the principles of epidemiology will lessen the toll of venereal disease quite out of proportion to the results obtained by the moral approach alone.

Army experience is emphasizing the value of prompt diagnosis and prompt treatment to render the individual non-infectious. The value of contact investigation in discovering sources of infection and, more important perhaps, *places* where infection is acquired; the value of prophylaxis as a preventive measure; the importance of obtaining accurate data on the distribution of disease to the end that control measures may be more sharply focused.

The best results can be obtained only by greater utilization of specially qualified medical personnel. A most important step was taken by the War Department when it authorized the assignment of qualified venereal disease control officers to large camps, to the major headquarters of the Army, and to all theaters of operation. Merged into the regular medical service of the Army, the influence of this handful of specialists is far-reaching. They study the problem, determine where and under what circumstances soldiers are being infected; why rates are high in one organization and low in another; what new forms of treatment or improved administrative methods may reduce the days lost from duty. They serve as advisers in these matters to their

superior officers, and assist in coordinating the efforts of military and civilian groups. They thus act in the military organization as a catalyst, making it possible more fully to utilize the available resources in combating these diseases.

I enlarge upon this feature of the Army's efforts because it seems to me no less important that a civilian program be built around medical specialists in this field. This has already been done in some states, but in too many states and cities in this country an effort has been made to do a big job with personnel inadequate both as regards quality and quantity. It is true that the Army has taken many well qualified men in this field from civilian life, but I can assure you that eventually the Army will repay this debt many times over.

A second noteworthy lesson to be drawn from Army experience is an understanding of the fundamental importance of the acceptance by the individual of some measure of personal responsibility in the control of these diseases. Related to this are questions concerning education and leadership.

Reference has already been made to the importance of education. The influence of that intangible quality called leadership is less well understood. In the Army it is a well established principle that the commanding officer is responsible for the health and welfare of his troops. Just as in civilian life, some diseases such as tetanus and small-pox can be prevented by purely medical measures. Whenever the individual must assume a measure of responsibility in his own protection, however, the rôle of the commanding officer cannot be overestimated, for in the Army this is related to discipline and morale, both of which stem from leadership. The same elements are present in civilian life. Civic leaders can do much to strengthen in the ordinary citizen the

desire to do the right thing, a pride in one's place in life, and a deep conviction concerning the dignity of the individual. I feel that our community leaders should play a more prominent part both as individuals and through groups in furthering measures that lead to good health. This must be done by leading, not by driving. I hope the day will come when the venereal diseases are universally regarded as diseases, not crimes. Punitive measures invariably promote concealment and operate directly against the best interest of the affected individual and the public health.

We are witnessing in many communities the successful control of disease through close integration of health, law enforcement, welfare, and other civic agencies. This is dynamic social action, which can be just as effective in peace as in war. Venereal disease control is essentially a local affair. Programs and funds may originate centrally, but in the final analysis we get only that amount

of control which the local community is willing to support. Blood test surveys on selectees have turned the light of day on venereal disease conditions in every community in the land. It is to be hoped that these data will be a stimulus to action at the earliest possible moment.

And, finally, I believe that this total mobilization for war has given us a new concept of the relation of health to welfare and efficiency. Time and again we see how the illness of one man may seriously cripple the team—a bomber crew, a tank crew, or a specially trained combat unit. The Army cannot afford the waste occasioned by venereal disease; our civilian economy now and after the war can no better afford it. We are developing, through this necessity for total effort, a new understanding of the individual's responsibility to stay well, of the community's responsibility to help him stay well, and of the physician as an integral and responsible part of community life and effort.

Fatal Staphylococcus Intoxication from Goat Milk

LYLE A. WEED, PH.D., M.D., AMOS C. MICHAEL, M.D., AND
ROLLA N. HARGER, PH.D.

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DURING the past decade there have been numerous reports of outbreaks of food poisoning due to Staphylococci. While such outbreaks are relatively common and frequently involve large numbers of people, fatalities are rare. In the timely summary entitled "Food Poisoning," by Dack² the statement is made that "Staphylococcus food poisoning in otherwise normal individuals is not fatal." While the incidence of fatalities is very small indeed, we believe there are records of apparently valid cases of fatal intoxication due to the ingestion of Staphylococci and their toxic products.

Dorling⁴ cites the case of an elderly individual dying 24 hours after eating the remainder of a can of soup opened 1 week previously. The patient had a whitlow on the left thumb at the time the can was opened. The soup had been kept at room temperature after opening the can. The onset of illness began with violent vomiting and diarrhea 3 hours after eating the soup. Post-mortem examination showed an inflammation of the gastric and intestinal mucosa. The gastrointestinal tract was filled with a thin ochre-colored fluid containing many Staphylococci similar to the organisms found inside the tin can. No Salmonella or similar pathogens could be isolated. The evidence in this case strongly suggests but does not prove that Staphy-

lococci were etiologically related to the illness.

Blackman¹ describes the case of a 12 year old colored girl who developed "vomiting, fever, headache, diarrhea, vertical nystagmus, fine tremor of the iris (hippus), spasticity and general collapse" 5 hours after eating a large Thanksgiving dinner. Death occurred 36 hours after the onset of illness. Post-mortem examination revealed "acute diffuse enteritis of ileum and jejunum, 'diphtheric membranes,' molds of ileum and jejunum, septicemia (*Staphylococcus albus*), thrombi in small vessels of intestine, liver, lung, kidney, vagina and lymph nodes, focal necroses in liver, spleen and bone marrow. Small hemorrhages in the stomach, colon, vagina, brain and meninges." There is some question in this case as to the fundamental nature of the etiology of the illness. The septicemia with numerous small thrombi and areas of focal necrosis diffusely distributed in the various organs suggest the condition was not due alone to the ingestion of many organisms and pre-formed toxins but more probably followed some unrecognized intra-abdominal staphylococcic infection.

Denys³ reported in 1894 one fatality in an outbreak involving several families, only two of which were interviewed for epidemiologic data. In this instance illness followed the eating of meat from

a cow which had suffered from puerperal sepsis. Symptoms included malaise, nausea, vomiting, diarrhea, abdominal pain, and prostration, with death following on the 3rd day. Bacteriological studies revealed many Staphylococci of both aureus and albus varieties, the latter predominating. Post-mortem examination in the one fatal case 3 days after death revealed much decomposition, moderate congestion of the peritoneum and intestine, with marked congestion of the trachea, larynx, and bronchi. The respiratory mucosa was red and infiltrated with "sanguinous suffusions."

Finnel⁵ cited in 1856 the case of a woman "who had died from poisoning by eating soup made from mutton, which had been cooked in the house for five or six days. The entire family, consisting of five persons, were poisoned; but all except the mother recovered. After eating the soup, the patient vomited and purged violently and died in a collapsed condition. The tongue throughout the attack was white." The details of the autopsy findings were not given. While the clinical findings were compatible with what is now recognized as Staphylococcus intoxication, there are not enough data to substantiate this interpretation.

Taylor¹¹ one hundred years ago recorded a case clinically typical of Staphylococcus intoxication with severe abdominal griping, vomiting, purging, and prostration, with the onset 3 hours after the meal. Since this was 40 years before Rosenbach demonstrated the relationship of Staphylococci to purulent lesions there are not sufficient data to prove they were the cause of the illness.

Epidemiologic data *—In the familial outbreak to be reported it would appear that two fatalities were due to the

drinking of raw, unrefrigerated milk drawn from a goat suffering from a unilateral mastitis.

On March 16, 1942, at 6:00 P.M. the goat was milked and nothing unusual was noted except that 6½ pints were obtained in place of the usual 8 pints. At 9:00 P.M. Ernest H., father of Ruth and Robert mentioned later, drank ½ pint of the milk. At 10:30 P.M. he became acutely ill with continuous vomiting and purging. At 11:00 P.M. he called the local physician and, after treatment by him, the vomiting and purging ceased. However, he continued to feel exhausted and complained of blurring of vision and of difficulty in focusing for the next few days.

On the morning of March 17, 1942, approximately 12 hours later, Mrs. E. H. used part of the milk (unrefrigerated) to make biscuits and gravy. This was served to 7 adults and 4 children (16, 8, 4, and 3 years of age). In addition Ruth and Robert (3 and 4 years old, respectively) each drank ¼ pint of the milk. Cream from the milk was served in the coffee which the adults drank. One and one-half hours later Ruth and Robert, suddenly while playing on the floor, and without warning, started vomiting. Robert had marked purging. There were no other complaints. At 11:00 A.M. the local physician was consulted and a prescription was obtained. The nature of this is unknown. Their condition continued to become worse and another physician was called to the home. At 6:00 P.M., which was the regular milking time, the goat was found dead. At 3:00 A.M. on March 18, 1942, Ruth died without convulsions. Robert died on the way to the hospital at 7:00 A.M., less than 24 hours after drinking the milk.

All the persons involved had been accustomed to drinking goat milk daily. The owner, mother of Ernest H., recalled that the animal had had a scratch on a teat two weeks previously.

* Taken mainly from the formal report of the district health officer.

This had been treated with a carbolic salve until March 15, 1942.

Chemical examination of the viscera of the goat and of these two children failed to detect any type of recognizable poisons which might have given rise to the gastrointestinal symptoms. Tests for fluorides, oxalates, arsenic, mercury, and other heavy metals were made.

Gross Pathological Findings—The significant gross findings in the goat were limited to the udder, one side of which was greatly swollen, red, and firm. The teat from this side had been removed post-mortem, presumably by the local veterinarian who had been consulted concerning the cause of death. An incision into the swollen side revealed marked congestion with numerous dilated lactiferous ducts containing a light reddish-brown fluid suggestive of bloody milk. No definite grossly visible abscesses could be found. The kidneys showed a small amount of cloudy swelling.

In the two fatal human cases the hearts, lungs, livers, spleens, and kidneys showed no significant demonstrable gross abnormalities.

Microscopic examination—(Goat) The sections of the udder showed numerous small abscesses containing Gram-positive cocci. In many areas the lumina of the lactiferous ductules contained purulent material composed of polymorphonuclear leucocytes and many Gram-positive cocci. The liver showed a moderate amount of fatty degeneration around the central veins but no abscesses or focal collections of leucocytes were found. Sections of the kidneys showed necrosis of the tubular epithelium in the cortical portion with cell outlines being completely obliterated. The glomerular loops contained a moderate number of polymorphonuclear leucocytes. There was a diffuse polymorphonuclear infiltration between the tubules in the cortical region. There was only an occasional sub-capsular

collection of leucocytes suggestive of beginning abscess formation.

(Children) The lungs showed a moderate amount of pulmonary edema with marked congestion of the alveolar vessels. In a few areas there appeared to be definite hemorrhages into the alveolae. The heart showed no demonstrable histopathology. There was a small amount of leucocytic infiltration—mainly polymorphonuclear—in the peri-portal areas of the liver with a moderate amount of fatty degeneration around the central veins. There was a slight increase in the nuclear content of the glomerular loops but no cortical necrosis as was seen in the goat kidneys. The cortical necrosis reported⁶⁻¹⁰ to be found in the kidneys of animals dying from the effects of *Staphylococcus* toxin was not present in the organs from the children.

Bacteriological examination—Smears made directly from the part of the udder showing the mastitis revealed myriads of Gram-positive cocci in clusters. The organisms appeared to be as numerous as found in a full grown fluid culture of *Staphylococcus aureus*. Plates streaked for isolated colonies revealed enormous numbers of colonies of hemolytic *Staphylococcus aureus*. No other type of organism was found by smear or culture.

By careful aspiration and by making several sections through the udder it was possible to obtain about 10 ml. of light reddish-brown fluid suggestive of blood tinged milk. This was used for animal inoculation. The material was centrifuged to obtain a supernatant fluid free of bacteria and leucocytes. Kittens injected with this material reacted with vomiting and diarrhea typical of the reactions described as being due to *Staphylococcus* toxin.*

* Monkeys were not available for testing the material although they would have been preferred. Fresh normal goat milk was likewise not available but the need for this was obviated as shown in the immunological data.

It would have been interesting, in the light of epidemiologic data, to have determined whether the enterotoxin in this supernatant fluid recovered from the udder was thermolabile or thermostable. However, the amount of material available was not sufficient to test both its thermolability and its immunological properties. Since our main problem was to demonstrate whether such material from the udder might be related to the cases of intoxication, it was decided to use the material for the immunization experiment.

Immunological investigations—*Staphylococcus* toxin was prepared by growing the homologous strain in semi-solid agar under 20 per cent CO₂. The filtrate injected into kittens produced typical syndromes of vomiting and diarrhea. A series of 6 kittens was divided so that 3 were immunized over a period of 4 weeks by starting with small doses subcutaneously and gradually increasing the amount until 0.5 ml. amounts were given. The other 3 served as controls. At the end of this time they were tested for immunity to the toxic principle in the material taken from the udder. Three immunized kittens injected with the supernatant fluid of the material taken from the goat's udder did not develop any gastrointestinal symptoms. The 3 control kittens receiving aliquot portions of the supernatant developed typical reactions with vomiting and diarrhea in 1 to 2 hours.

DISCUSSION

The symptoms exhibited by the patients were typical of those which have been produced in human volunteers consuming known cultures of *Staphylococci*. The history of injury to the teat, the presence of an extensive acute suppurative mastitis due to *Staphylococcus aureus*, the reproduction of the symptoms in kittens, the immunization against this toxic material in the udder

by using a filtrate of a culture of the homologous strain of *Staphylococcus aureus*, all indicate that the symptoms in the patients were due to the toxin of this organism. It is generally accepted by most investigators of this subject that a separate entity called enterotoxin is responsible for the symptoms of diarrhea, nausea, vomiting, and abdominal pain. Dack, *et al.* have not been able to produce gastrointestinal symptoms with filtrates not containing enterotoxin. However, this does not mean that under proper circumstances similar symptoms may not, at least sometimes, be effected by the so-called "lethal factor" which is thought to be responsible for the death of rabbits when injected intravenously. Whether the symptoms of collapse and prostration are related in part or entirely to the vomiting and diarrhea or to the effect of the lethal toxin is not certainly known. The production of symptoms in Ernest H. 3 hours after drawing the milk suggests but does not prove that the toxin was present in the milk at the time it was drawn. The cortical necrosis in the kidneys of the goat were similar to the reactions previously described as resulting from injury by the toxin of *Staphylococcus aureus*. The pathological findings in the children under the conditions of examination did not reveal anything which could be logically considered the cause of death.

SUMMARY

Data are presented to indicate that 3 patients developed food intoxication by drinking milk of a goat suffering from an acute suppurative mastitis due to *Staphylococcus aureus*. Two of the patients (3 and 4 years old) died within 24 hours after each drank $\frac{1}{4}$ pint of the milk. Individuals consuming the cooked milk did not develop symptoms. The goat died within 24 hours after the milking related to the onset of symptoms. Material taken

from the udder post-mortem reproduced the symptoms in kittens. It was possible to immunize the kittens against this material by repeated injections of a filtrate from the homologous culture. The evidence suggests the possibility that if an enterotoxin was present it was thermolabile or that the lethal factor was responsible, at least in part, for the symptoms.

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Rationing Milk in New York City

Ernest L. Stebbins, M.D., Commissioner of Health of New York City, recently declared himself as being opposed to reductions in the current fluid milk consumption in New York City which may be contemplated under recent orders of the War Food Administration. Commissioner Stebbins stated that, in his opinion, cuts in current milk consumption should be made only as a last resort, and that no reduction should be made in the milk supply of schools and other institutions nor in the amount of milk sold at stores or through retail deliveries for home use.

If cuts in fluid milk consumption prove absolutely necessary, it was recommended that they should be made first through further reduction in uses for whipped cream, table cream, candy and frozen desserts. If still further reductions are absolutely imperative, a possible curtailment would be to take out from the fluid milk served to restaurants and soda fountains, even though this may affect the nutrition of some industrial workers.

Dr. Stebbins gave the following broad classifications of milk uses in New York City in order of relative importance:

| | Number of Persons | Quarts of Fluid Milk Daily |
|---|----------------------|--|
| 1. Children in institutions (under 15 yrs. of age) | 30,000 | 30,000 |
| 2. Penny milk and free lunch milk | ..... | 150,000 |
| 3. Balance of child population (under 15 yrs.) | 1,413,000 | 1,060,000 |
| 4. Adults in institutions | 50,000 | 30,000 |
| 5. Other institutional use (cooking, staff use, etc.) | ..... | 15,000 |
| 6. Balance of adult population | 6,131,500 | 1,915,000 |
| Total | 7,624,500 | 3,200,000 |

Classification of Types of Milk Delivery Services in order of relative importance:

| | Estimated Quarts Daily |
|---|------------------------|
| 1. To institutions | 75,000 |
| 2. To schools (penny milk and free lunches) | 150,000 |
| 3. To retail stores and direct to houses | 2,545,000 |
| 4. To restaurants and soda fountains | 430,000 |
| Total | 3,200,000 |

The Sanitary Privy and Its Relation to Public Health

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IN the early part of the 20th century it was discovered that the prevention or control of typhoid fever, diarrhea, dysentery, hookworm, and other enteric diseases was dependent upon the sanitary disposal of human excreta. The facilities developed to break the chain of transmission of these diseases between the patient or carrier and the susceptible host were sewerage systems, septic tanks, and sanitary privies. In areas where sewers or septic tanks were impracticable, sanitary privies came to be recognized as essential facilities in the protection of the public health.

During the period 1910 to 1913, state boards of health became active in the control of hookworm. These agencies were assisted by the U. S. Public Health Service and volunteer health organizations. The Rockefeller Sanitary Commission, which was established in 1909 to combat hookworm disease, sponsored hookworm control programs in the South. Sanitation and infestation surveys made in 11 southern states confirmed the presence of hookworm disease in every one of the 700 counties investigated, and indicated that soil pollution was the chief factor in the spread of this disease. Programs for the control of hookworm disease followed these surveys. These programs involved free examination and treatment of patients, installation of sanitary privies, and promotion of their use. Emphasis was placed on the use

of sanitary privies as a means of protection against typhoid fever and dysentery as well as hookworm disease. Concurrently the Public Health Service carried on rural sanitation demonstration projects.

In 1914-1917, Dr. L. L. Lumsden of the Public Health Service and his coworkers made house-to-house sanitation surveys in 18 representative counties in 16 states, the work being financed by a federal appropriation. These rural sanitation enthusiasts convinced local authorities in West Virginia, Indiana, Washington, and other selected states that sanitary privies were a good investment. As a result, local funds were provided for employment of public health personnel whose major duty it was to see that throughout the community human excreta were disposed of in a sanitary manner. This rural sanitation activity provided the groundwork for organization of the early full-time county health units in the United States. Thus, the lowly privy may be considered a primary factor in the development of a movement of tremendous health significance to the nation as a whole.

The public health personnel with experience in the conduct of such rural sanitation projects served as the nucleus for the extra-cantonment sanitation program during World War I. There were at that time few well organized state and local health departments;

hence the Public Health Service assigned medical and sanitation personnel to the extra-cantonment zones. It was one of their duties to organize and direct local efforts toward obtaining safe water, safe milk, and, above all, sanitary disposal of human excreta. The construction of several thousand sanitary privies was a major part of this program. In addition to protecting the health of the armed forces and civilians in the war areas, perhaps the most significant result of this close coöperation between the Public Health Service and state health departments was the further stimulation of the development of full-time local health services.

During the interval between the first World War and the economic depression in the early 1930's, state health departments were strengthened, additional local health services were organized, and sanitary privy construction was carried on as an important function of these agencies. Plans, specifications, and regulations governing the construction and maintenance of septic tanks and sanitary privies were developed. Personnel were assigned to conduct sanitation surveys and educational campaigns, enforce the sanitary laws where necessary, and supervise the construction of septic tanks and sanitary privies. Thus the foundation was laid for the future nation-wide privy construction program undertaken to protect the public health and give employment to relief labor.

In December, 1933, the Civil Works Administration was established to relieve unemployment. The U. S. Public Health Service recognized in this program an opportunity to improve rural sanitation work, and secured an allotment of CWA funds for the construction of sanitary privies. This was the beginning of the "millennium" for the men who had spent years in promoting construction of sanitary privies through education, exhortation, persuasion, and

enforcement of sanitary laws. The CWA furnished the necessary labor, and property owners provided the materials. Technical supervision of the community sanitation projects was provided by the Public Health Service through personnel assigned to the state health departments. This program, although of short duration, demonstrated that the construction of sanitary privies was a desirable work-relief project in the field of public health. Similar community sanitation projects were continued under the Federal Emergency Relief Administration and the Work Projects Administration.

Observation of privies constructed prior to the inception of the federal work-relief program revealed that practically all pit privies had wood floors and risers which rapidly decayed and were difficult to keep clean. Recognizing the need for a more permanent type of construction, the Public Health Service developed a concrete slab and riser type of privy. A majority of state health departments either adopted this design or developed a similar type of concrete slab and riser earth pit privy. After observing advantages afforded by concrete slabs and risers a number of states made this type of construction mandatory. About 90 per cent of the privies constructed during the fiscal year 1939 under the Community Sanitation Program were of this type.

During the period from December, 1933, through June, 1942, 2,911,323 sanitary privies were constructed in 38 states and in Puerto Rico through the coöperative effort of the CWA, FERA, WPA, state health departments, and the U. S. Public Health Service.

To appreciate the magnitude of the Community Sanitation Program conducted by the work-relief agencies during the last 10 years it is only necessary to indicate the materials required and the funds involved in the construction of nearly three million privies. The

amounts of materials used were roughly as follows:

| | |
|-------------------|-----------------------|
| Lumber | 1,000,000,000 bd. ft. |
| Cement | 6,000,000 bags |
| Sand and gravel | 1,000,000 cu. yds. |
| Reinforcing steel | 12,000 tons |
| Roofing | 110,000,000 sq. ft. |
| Nails | 24,000,000 lbs. |
| Hinges | 6,000,000 pairs |

It is assumed that the average costs of material and labor were \$15 and \$20 respectively, and that supervisory costs were 5 per cent. On this basis it is estimated that the sum of \$110,000,000 was expended for the construction of sanitary privies under the various work-relief programs. Of this amount, approximately \$45,000,000 was provided for materials by the property owners concerned.

What benefits, in addition to affording employment to an estimated average force of about 15,000 men, accrued from this sizeable expenditure? Concurrently with the Community Sanitation Program remarkable progress was made in the construction of municipal water and sewerage systems, in milk sanitation, and in other aspects of environmental sanitation through the federal grants-in-aid system designed to further public health activities. Therefore, it is impossible to claim for any one activity a predominant rôle in the reduction of intestinal diseases. Nevertheless, in states such as West Virginia, Tennessee, North Carolina, and Mississippi, where the greatest number of sanitary privies were constructed, there were significant reductions in the incidence of typhoid fever, dysentery, and other intestinal diseases. In view of the large number of persons employed on the projects and the fact that in "selling" 3,000,000 privies it was necessary to explain to at least 15,000,000 persons the reasons why sanitary excreta disposal was essential to protect the public health, it cannot be doubted that the Community Sanitation Pro-

gram contributed significantly to public understanding of the importance of this phase of environmental sanitation.

Further impetus to the sanitation of rural areas was provided by the Farm Security Administration, whose public health program was organized and directed by officers of the Public Health Service. The FSA realized that farmers ill with typhoid fever, dysentery, or malaria could not maintain adequate farm production or repay crop loans. Therefore, a farm sanitation program was organized, the basic elements of which involved provision of sanitary privies, safe domestic water systems, and screening of homes. Under this program approximately 92,000 sanitary privies were installed, 45,000 domestic water supplies were protected, and 58,000 homes were screened. Work was carried on in all 48 states, and, since the FSA assisted farmers whose financial resources were extremely meager, the work was done on properties where it was most needed and where sanitation paid the greatest dividends. Many of the farms on which improvements were made had previously lacked privies of any kind. State and local health departments participated in the FSA program, and their policies were adhered to and respected by the federal agency.

During the present emergency state and local health agencies are in a much better position with regard to extracantonment sanitation than they were during the first World War. Sanitation personnel have been recruited and trained by the Public Health Service and have been assigned to the states to assist in maintaining and improving environmental sanitation in war areas.

Although outstanding progress has been made in the construction of sanitary privies, much remains to be done in providing sanitary excreta disposal facilities where water carriage sewerage systems are impracticable. Reconnaissance

sance surveys made by the Public Health Service indicate that about 165,000 additional sanitary privies are needed in the war areas. Thus it is apparent that privy construction is an important part of the present extra-cantonment sanitation program. The 1940 census revealed that there are 14,778,360 rural homes in the United States. Of these, 9,631,762 are served by outside toilets and 907,923 have no toilet facilities. The 3,000,000 privies constructed under the work-relief programs, and 50 per cent of the remainder of the privies serving rural homes, or a total of about 6,300,000, now are assumed to be reasonably satisfactory. On this basis it is conservatively estimated that more than 4,000,000 additional sanitary privies are needed in this country. The construction of these basic sanitary facilities should be included in any post-war public works program which may be instituted to relieve unemployment. In any event, after the present emergency, state and local health departments should assign sufficient personnel to rural sanitation activities to conduct educational campaigns, to secure the enactment and enforcement of adequate sanitation ordinances, and to provide sanitary excreta disposal facilities for about 16,000,000 people now without these fundamental necessities.

The sanitary privy has a definite relationship to public health and in this

connection, the following points are significant:

1. In areas where water carriage sewerage systems are impracticable the privy is the facility relied upon to break the transmission chain of intestinal diseases.

2. Privy construction programs, originally undertaken in the hookworm and typhoid fever regions in the South thirty years ago, contributed substantially to the early development of full-time local health services. At present more than 1,800 counties in the United States have such services.

3. The 3,000,000 sanitary privies constructed under the various work-relief programs have had an important effect in reducing the incidence of intestinal diseases.

4. The close association of U. S. Public Health Service officials with state health departments in rural sanitation campaigns over a period of 30 years has been instrumental in developing the *esprit de corps* which now enables local, state, and federal health services to cope successfully with problems of sanitation, malaria, venereal disease, and industrial hygiene in critical war areas in America today.

5. The fundamental principles of federal-state coöperation, successfully demonstrated in the rural sanitation programs, are now being applied throughout the field of public health. In addition, coöperative plans for public health work among selected population groups have been developed by the Public Health Service with other federal agencies. The Farm Security Administration's health and sanitation program is an example of federal coöperative health work.

6. Approximately 4,000,000 additional sanitary privies are needed to serve about 16,000,000 persons now without sanitary excreta disposal facilities, who for the most part reside in areas having the highest incidence of typhoid fever, dysentery, and hookworm.

Further Studies on One Type of Paracolon Organism^{*}

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FOR many years continental bacteriologists, including the English, have considered the paracolon organisms as a group intermediate between the coliform and *Salmonella* bacteria. Topley and Wilson (1938) say of the paracolon group, "Certain of these species are definitely pathogenic for man. Others are under suspicion in this respect. Others again are almost certainly non-pathogenic." Stuart *et al.* (1943), after studying 465 paracolon cultures, isolated for the most part from gastroenteritis patients over a period of 4 years, came to identical conclusions. These investigators found that the paracolon group, like the coliform bacteria, could be divided into three sections: paracolon *Aerobacter*, paracolon intermediates, and paracolon *Escherichia* according to their IMViC reactions. Each section was again divided into a number of biochemical types according to their carbohydrate reactions.

Of all cultures studied biochemical type 32011,[†] a paracolon *Aerobacter*, offered the best evidence for pathogenicity. Thirty-one of the 35 strains investigated were isolated from gastro-

enteritis patients and 4 from food handlers in one or another institution in which the strain had been isolated during so-called food poisoning epidemics. In the course of 5 weeks in the Rhode Island Hospital 4 patients listed as "typhoid suspects" yielded almost pure cultures of biochemical type 32011 from the feces and one a pure culture from the blood.

At the April, 1942, meeting of the New England Health Institute the senior author read a paper on the paracolon group, emphasizing the probable pathogenicity of biochemical type 32011 (hereinafter called bio-type). Within one year 114 strains of this organism were received from a number of New England laboratories.

Bio-type 32011 ferments glucose, maltose, mannitol, and frequently salicin, in 24 hours. Strong acid reactions (brom cresol purple indicator) and 20 to 30 per cent gas are produced in glucose and, when positive, in salicin. In maltose, however, a moderate acid reaction with or without a bubble of gas and in mannitol a moderate to strong acid reaction and a bubble to 10 per cent gas are produced in 18 to 24 hours. Lactose and sucrose are fermented slowly or not at all; some strains ferment one or another or both of these carbohydrates in about 6 days and other strains only after 3 to 4 weeks. Some strains ferment salicin rapidly, others slowly, and some are negative. Growth, usually of the beaded type, occurs on citrate agar in 5 to 30 days

^{*} Presented before the Laboratory Section of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 12, 1943.

[†] Biochemical type 32011 was previously described by Stuart, *et al.*, 1943. After their paper was published it was found that cultures with the biochemical reactions of 32011 could be divided into several different serological types as shown in Table 1. Biochemical type 32011—serological type 32611, for example, means that cultures of serological type 32611 have all the biochemical reactions of 32011 but differ antigenically from 32011.

and the Voges-Proskauer reaction is positive though usually weak with freshly isolated strains. A great majority of strains are motile. The only nonmotile paracolon *Aerobacter* encountered among 343 cultures studied in this laboratory to date were not only bio-type 32011 but also sero-type 32611 (Table 1). (One previously reported nonmotile paracolon *Aerobacter*, bio-type 32821, Stuart, *et al.* (1943), was found to be bio-type 32011 and sero-type 32611.) Because of the relatively slow action on maltose and mannitol in 18 to 24 hours bio-type 32011 almost always can be distinguished easily from other paracolon types of any section.

Table 1 shows that 58 strains were sero-type 32011 while 21, 15, 9, 9, 7, 6, and 2 were sero-type 26311, 44311, 32611, 63511, 56211, 70811, and 64811, respectively. All eight sero-types possessed interlocking somatic, and in some instances flagellar, antigens. Three sero-types had minor, unlabeled somatic antigens in common with *Salmonella choleraesuis* and *Salmonella rubislaw*.

Twenty-two of the 149 strains did not belong to any of the eight sero-types. These strains, however, possessed antigens in common with one or another of the eight sero-types. Fourteen of them agglutinated to high titers with one or another of the eight antisera (five to

TABLE 1
Serological Types of Biochemical Type 32011

| | Sero-types | | | | | | | | |
|-------------------|------------|-------|-------|-------|---------|-------|-------|-------|---------|
| | 32011 | 26311 | 44311 | 63511 | 32611 ° | 56211 | 70811 | 68411 | Unknown |
| Number of strains | 58 | 21 | 15 | 9 | 9 | 7 | 6 | 2 | 22 |

° = All strains nonmotile

Of the 35 strains isolated from gastroenteritis patients as mentioned above, 32 were antigenically identical or closely related. As new cultures were obtained, however, it was evident that bio-type 32011 was serologically heterogeneous. Biochemical reactions were of no value in establishing different sero-types in this bio-type. Several strains of bio-type 32011 agglutinated in serum dilutions of 160 and a number of others in dilutions as high as 1280 of 32011 antiserum, but failed to reduce the homologous titer when used to adsorb the antiserum. Antisera were prepared from one culture agglutinating to 160 and from one agglutinating to 1280. Thus two new sero-types were established. By agglutination and adsorption tests with the three antisera, and the preparation of additional antisera, eight sero-types were identified in bio-type 32011.

Of a total of 149 strains of bio-type 32011, 127 (85.2 per cent) fell into one or another of eight sero-types.

the homologous titer) but in no instance was the homologous titer of any antiserum reduced upon adsorption.

Unfortunately, adequate information could not be obtained about the source of all of the 114 new strains. Eighty-six were from gastroenteritis patients (81 from feces and 5 from blood), 7 from food handlers, 2 from apparently normal contacts of patients, 1 from milk, 1 from pastry, and 17 from fecal specimens of unknown history. Eleven strains of sero-type 32011 and 3 of sero-type 26311 were isolated from patients listed as "typhoid suspects" which, with the 4 previously cited, make a total of 18 strains of bio-type 32011 isolated from patients suspected of having typhoid fever.

DISCUSSION

Adequate methods for the accurate determination of the toxicity and pathogenicity or aggressiveness of the *Enterobacteriaceae* are lacking. Despite this the pathogenicity for man of certain

Salmonella and *Shigella* species is well established if for no other reason than by the large mass of *in vivo* evidence. The pathogenicity of other species in these genera has been questioned. Because, for example, *Shigella alkaescens* (Andrews 1918) has been isolated occasionally from normal individuals, it usually is considered nonpathogenic. Both Neter (1942) and Weil (1943), in their reviews on *Shigella* agree that sufficient evidence has accumulated to show that under certain conditions this species can cause gastroenteritis and other infectious processes.

In view of the foregoing it seems that the pathogenicity of paracolon bacteria will not be established easily. Some bacteriologists will concede that a paracolon culture and a *Salmonella* type with identical somatic antigens will possess the same endotoxins, but the two cultures may have entirely different aggressive properties. For paracolon cultures such as bio-type 32011 having no major antigens in common with *Salmonella* the evidence for pathogenicity must rest on the sources and frequency of isolations.

Where epidemics have occurred in institutions a careful search has nearly always located a food handler carrying the organism. In specimens from food handlers plated on eosin-methylene-blue agar bio-type 32011 comprised only a small fraction of the flora while specimens from patients after onset of symptoms usually gave almost pure cultures of the organism. The loss of symptoms coincided with the disappearance of almost pure cultures from the feces.

The close association of the organism with gastroenteritis is shown by the following example: In a neighboring hospital 28 cases of mild to acute gastroenteritis occurred among patients and staff over a period of several hours on one day. A milk supply was the

only common factor other than water. The 48 hour milk plates which had been counted the day before the epidemic had not been discarded, and isolations were made from these plates. Because of the loss of personnel due to the war only 2 fecal specimens from patients reached the laboratory. Several cases were reported in the city, emanating from a restaurant using the same milk supply as the hospital. A fecal specimen from one patient and cream filling from pastry were sent to the laboratory. From the cases in the hospital and city, the milk plates of the hospital, and from the cream pastry organisms of bio- and sero-type 32011 were isolated. Two laboratory infections have been caused by this organism, one in a student frequently working with bio-type 32011 and the other in a technician washing glassware, who had an acute gastroenteritis attack 4 days after a number of broth tubes of this organism had been placed by mistake in a basket marked "nonpathogenic."

Each year for the past 7 years fecal specimens from about 50 normal students have been examined. A few paracolon cultures have been isolated from these specimens but never bio-type 32011.

It hardly can be coincidence that 116 bio-type 32011 strains were isolated from known gastroenteritis patients and 11 from food handlers involved in epidemics, or that the same organism was isolated from milk or milk products involved in an epidemic or that 18 strains were isolated from typhoid suspects.

SUMMARY—Strong evidence has been found of the pathogenicity for man of one type of paracolon *Aerobacter*.

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Neutralization of SK Murine Poliomyelitis Virus and of Theiler's Virus of Mouse Encephalomyelitis by Human Sera *

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IT is generally accepted that a majority of normal human sera contain substances which are capable of inactivating various strains of monkey poliomyelitis virus. It is also commonly agreed that the frequency with which such sera neutralize the virus tends to be appreciably higher than that observed with sera obtained from poliomyelitis convalescents. The nature of this phenomenon is by no means clearly understood. Nevertheless, the neutralization test has often been used in surveys as an epidemiological tool to indicate the distribution of latent immunity, and hence presumable exposure to the disease, in human populations.

The possible occurrence in human sera, both normal and convalescent, of similar neutralizing substances against rodent poliomyelitis virus was first explored with the murine Lansing strain. The work of Harford and Bronfenbrenner,¹ Kramer,² and Toomey and Takacs,³ reflecting extensive experience with mice or cotton rat experiments, suggested that virucidal antibodies may develop, though not regularly, during

convalescence from an attack of poliomyelitis. Somewhat analogous observations were recorded by Plotz, Reagan, and Hamilton,⁴ who employed virus of the Lansing strain adapted to the Syrian hamster. Different conclusions, however, were reached by other authors, including Armstrong and his coworkers.^{5, 6} Thus, while from 65 to 75 per cent of all human sera examined were capable of neutralizing the Lansing murine virus in intracerebral tests in albino mice, it appeared that the determining factor for the production of such antibodies was age rather than the individual's experience with clinically recognized poliomyelitis. A similar opinion was expressed by Hammon and Izumi⁷ as well as by Turner and Young,⁸ the former authors also stressing the difficulties which surround the interpretation of results obtained with a not too well adapted virus, such as Armstrong's mouse strain.

There seems fair agreement, then, that neutralizing substances against the Lansing murine virus are widely distributed among human beings, but that the presence of these substances is no reliable measure of known previous contact with the actual disease. In other words, the picture is very much the same as had previously been assembled

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from the prolonged study of neutralization tests with human sera, both normal and convalescent, against simian strains of poliomyelitis virus in rhesus monkeys. It may therefore be said that the neutralization test, carried out with rodent poliomyelitis virus, fails to offer any constructive aid in the diagnostic problems of the disease. By further implication it becomes apparent that tests of this kind are of little value in determining the etiological position within the poliomyelitis group of a given neurotropic murine virus.

Little information has yet been gathered on neutralization of the murine strain of SK poliomyelitis virus by human sera, normal or convalescent. In a previous communication⁹ it had been reported that normal human serum (3 samples) failed to inactivate SK murine virus, whereas convalescent serum (1 pool) proved capable of bringing about partial neutralization of small doses of virus (2 m.f.d.). These tests were carried out in mice by the intraperitoneal method.

Comparable data referring to neutralization of Theiler's virus of mouse encephalomyelitis by human sera are very scanty. Following Olitsky's¹⁰ original report that pooled convalescent serum possessed no neutralizing power against Theiler's virus, Young and Cumberland¹¹ recently stated again their inability to demonstrate any neutralizing capacity in either normal human sera or in sera from poliomyelitis convalescents. All of the above tests were carried out in mice by employing the intracerebral route for the injection of virus-serum mixtures.

In view of the limited character of these earlier observations, it seemed of interest to examine a larger number of human sera, both normal and convalescent, for their ability to neutralize SK murine poliomyelitis virus. Since the murine SK strain possesses a fairly high and uniform potency on intra-

peritoneal injection, the latter route was chosen for injecting virus-serum mixtures. At the same time it was thought advisable to review the possibilities of obtaining neutralization of Theiler's virus by human serum with the intraperitoneal method of testing. The reasons which prompted this reinvestigation were: (1) that it had been found difficult—if not impossible—to secure satisfactory evidence of neutralization of Theiler's virus, in intracerebral tests, by specific rabbit hyperimmune serum, whereas the same serum proved extremely potent in intraperitoneal tests; and (2) that by utilizing the intraperitoneal route for the injection of mixtures of virus and hyperimmune sera it had been possible to disclose the existence of a broad serological relationship between the various viruses belonging to the poliomyelitis group, i.e., Theiler's virus, SK murine poliomyelitis virus, MM murine poliomyelitis virus, and monkey poliomyelitis virus.^{12, 13}

The results obtained in the investigation of the problems referred to above are presented in two sections of this paper.

EXPERIMENTAL

1. NEUTRALIZATION TESTS WITH SK MURINE POLIOMYELITIS VIRUS AND SERA FROM NORMAL INDIVIDUALS OR FROM POLIOMYELITIS CONVALESCENTS

Material—SK murine virus was harvested from the brains of paralyzed mice, representing the strain in its 219th and subsequent mouse passages. The sera comprised samples from both normal individuals and poliomyelitis cases and contacts. The normal sera were obtained from Beth Israel Hospital, New York, N. Y., or from the State Laboratory, Albany, N. Y. They had been inactivated for $\frac{1}{2}$ hour at 56° C. prior to being used in routine Wassermann tests. The New York

TABLE 1

Neutralization of SK Murine Poliomyelitis Virus by Human Sera from Normal Individuals and Poliomyelitis Convalescents or Contacts

| Type of Serum | Number of Sera | Positive | | | Negative |
|-----------------------------|----------------|-----------|-----------|----------|----------|
| | | 20 m.f.d. | 10 m.f.d. | 1 m.f.d. | |
| Normal urban population | 102 | 3 | 8 | 10 | 81 |
| Normal rural population | 30 | 0 | 0 | 1 | 29 |
| Poliomyelitis cases (early) | 10 | 0 | 0 | 2 | 8 |
| Poliomyelitis cases (late) | 9 | 0 | 0 | 1 | 8 |
| Poliomyelitis contacts | 16 | 0 | 0 | 2 | 14 |
| Total | 167 | 3 | 8 | 16 | 140 |

City sera came preponderantly from adult urban individuals, the Albany sera from adult persons with rural residence. The sera from poliomyelitis patients, or from healthy family members who had been in contact with such cases, had been collected by Dr. Gilbert Dalldorf during an outbreak of the disease in Westchester County in the fall of 1941; they included sera from both children and adults. Some patients' sera represented repeat samples taken during the early stages of the attack and again later in convalescence.

Methods—Undiluted sera were mixed with variable virus dilutions in a ratio of 1:10, yielding final dilutions of virus which were 10 times higher than the original test dilutions employed. Serum-virus mixtures were incubated for 1½ hours at 37° C. and then injected intraperitoneally, in a volume of 0.1 ml., into each of 3 young Swiss albino mice. Each test was controlled by including similarly incubated mixtures which contained the same dose of virus together with normal guinea pig serum. Normal guinea pig serum rather than saline was used since virus, in high dilutions, tends to deteriorate rapidly in salt solution, whereas serum affords some protection against this deterioration. All the sera were run against two initial virus dilutions, i.e., 1:10,000 and 1:100,000;

one-half of the sera were also tested against initial virus dilutions of 1:5,000 and 1:500,000, respectively.

Absence or presence of neutralization was appraised on the basis of a simple system which allowed due consideration for any periodic fluctuations that might occur in the level of potency of the virus. This pattern was as follows:

| Control Serum | Test Serum | Result |
|---------------|------------|----------|
| 3/3 | 3/3 | Negative |
| 3/3 | 2/3 | " |
| 3/3 | 1/3 or 0/3 | Positive |
| 2/3 | 2/3 | Negative |
| 2/3 | 1/3 | " |
| 2/3 | 0/3 | Positive |
| 1/3 | 1/3 | Negative |
| 1/3 | 0/3 | " |

Numerator = number of mice paralyzed;
denominator = number of mice injected.

Results—The ceiling of infectivity of the virus, under the conditions of the test, was in the neighborhood of 1:1,000,000 *final* virus dilution. In other words, up to and including this dilution, practically all of the control mice injected with mixtures of virus and normal guinea pig serum became paralyzed, whereas paralysis occurred irregularly with the next higher dilution. For the purpose of this test, therefore, a level of 1:1,000,000 *final* virus dilution was considered as repre-

senting one minimum fatal dose.* Table 1 will show the frequency and the degrees of neutralization obtained with the various human sera.

These figures demonstrate that the great majority of the sera examined possessed no neutralizing power whatsoever against SK murine poliomyelitis virus. Thus, of a total of 167 sera tested, 140 were completely negative while 27 were listed as positive. However, inasmuch as virus inactivation of only 1 m.f.d. represents a borderline phenomenon, with little or doubtful significance, there remain only 11 clearly neutralizing sera which were capable of inactivating 10 m.f.d., or in excess of 10 m.f.d., of virus. The latter sera were all encountered in a series of 102 specimens obtained from normal urban residents. The incidence of positive sera was therefore approximately 10 per cent for this particular series against about 6 per cent for the entire group. By contrast, the other two series, i.e., samples from normal rural residents or from poliomyelitis cases and contacts, were made up of sera which were essentially negative.

2. NEUTRALIZATION TESTS WITH THEILER'S VIRUS OF MOUSE ENCEPHALOMYELITIS AND SERA FROM NORMAL INDIVIDUALS

Material—The virus was the GDVII strain, originally received from Dr. Max Theiler of the Rockefeller Foundation. The strain has since been maintained in this laboratory by continuous transfer from mouse to mouse.¹⁴ The virus was obtained from the brains of paralyzed mice, representing the strain in its 120th and subsequent passages. The sera were samples which had been submitted for routine Wassermann tests to the diagnostic services of either Beth

Israel Hospital or Presbyterian Hospital. All sera had been inactivated for $\frac{1}{2}$ hour at 56° C. The donors were presumably all residents of New York City.

Methods—Neutralization tests were performed in young Swiss albino mice, using either the intracerebral or intraperitoneal route for injection of the virus-serum mixtures. Thirty sera were examined by the intracerebral method and another 100 sera by the intraperitoneal method. For the intracerebral test the undiluted sera were mixed with virus dilutions varying from 1:1,000 to 1:1,000,000 in a ratio of 1:10; the mixtures were held for $1\frac{1}{2}$ hours at 37° C. and were then injected intracerebrally into each of 3 mice in a volume of 0.03 ml. For the intraperitoneal test, serum-virus mixtures were prepared by combining undiluted serum with a standard virus dilution of 1:10 in equal proportions; after incubation for $1\frac{1}{2}$ hours, the mixtures, in a volume of 0.4 ml., were injected intraperitoneally into each of 3 or 5 mice. The level of 10^{-1} virus dilution was chosen because, although paralysis occurred occasionally with smaller doses of virus, it represented the only dilution which paralyzed mice fairly regularly upon intraperitoneal injection.* Adequate controls consisting of virus in combination with either normal adult mouse serum, normal guinea pig serum, or normal rabbit serum accompanied both series of tests.

Results—Of a total of 30 normal human sera examined, not a single specimen was capable of inactivating Theiler's virus in intracerebral tests. Inasmuch as the amounts of virus used extended well into the range of border-

* The intraperitoneal infectivity of the virus, at the indicated level, was well maintained over serial passages throughout the year, except during the summer months. Attempts to run additional tests between June and September had to be abandoned, in two successive years, because of loss of potency or marked irregularities in the intraperitoneal titer of the virus.

* Current passages of SK murine virus (300th and subsequent passages) titrate about 10 times higher intraperitoneally.

line infectivity, as determined by the response in control mice, the lack of neutralization cannot be attributed to excessive dosage of virus. Different results, however, were obtained in intraperitoneal tests, as will be gathered from Table 2. If neutralization be con-

DISCUSSION

The results obtained in this study reveal that in the neighborhood of 6 per cent of all human sera examined, normal or convalescent, were capable of inactivating SK murine poliomyelitis virus. This percentage of neutralization

TABLE 2
Neutralization of Theiler's Virus of Mouse Encephalomyelitis by Normal Human Sera (Intraperitoneal Test)

| Series | Sera | Incidence of Paralysis as Observed with Individual Sera | | | | | | | | | |
|--------|--|---|-----|-----|-------|-----|-----|-----|-----|-----|-------|
| | | 3/3 | 2/3 | 1/3 | 0/3 * | 5/5 | 4/5 | 3/5 | 2/5 | 1/5 | 0/5 * |
| I | 30 normal human sera | 5 | 11 | 8 | 6 | | | | | | |
| | 2 normal rabbit sera | | | | | 0 | 1 | 1 | 0 | 0 | 0 |
| | 1 normal adult mouse serum | | | | | 0 | 0 | 0 | 0 | 0 | 1 |
| II | 15 normal human sera | | | | | 0 | 3 | 3 | 4 | 3 | 2 |
| | 1 normal rabbit serum | | | | | 0 | 1 | 0 | 0 | 0 | 0 |
| | 1 normal cotton rat serum | 1 | 0 | 0 | 0 | | | | | | |
| III | 15 normal human sera | | | | | 13 | 1 | 0 | 1 | 0 | 0 |
| | 1 normal rabbit serum | | | | | 1 | 0 | 0 | 0 | 0 | 0 |
| | 1 normal guinea pig serum | | | | | 1 | 0 | 0 | 0 | 0 | 0 |
| IV | 40 normal human sera | | | | | 30 | 7 | 1 | 0 | 1 | 1 |
| | 9 normal rabbit sera | | | | | 8 | 1 | 0 | 0 | 0 | 0 |
| | 9 normal guinea pig sera | | | | | 9 | 0 | 0 | 0 | 0 | 0 |
| | 1 normal adult mouse serum | | | | | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 100 normal human sera | 5 | 11 | 8 | 6 | 43 | 11 | 4 | 5 | 4 | 3 |
| | 2 normal adult mouse sera | | | | | 0 | 0 | 0 | 0 | 0 | 2 |
| | 24 normal sera from rabbits, guinea pigs, or cotton rats | 1 | 0 | 0 | 0 | 19 | 3 | 1 | 0 | 0 | 0 |

* Numerator = number of mice paralyzed; denominator = number of mice injected.

sidered positive in case none of the mice receiving a particular serum-virus mixture developed paralysis, whereas between 60 and 100 per cent of the control mice receiving normal cotton rat, rabbit, or guinea pig serum-virus mixtures became paralyzed, it will be found that of a total of 100 normal human sera examined 9 neutralized Theiler's virus. An additional 4 human sera may have possessed slight virucidal power since more than three-fourths of the injected mice remained free from paralysis; but in view of the fact that the mortality among control mice varied from test to test and rarely reached the 100 per cent level, it would seem safer to ignore the latter reactions at present. The neutralization observed with the two normal adult mouse sera is, of course, characteristic of this virus and in line with previously established facts.

is substantially lower than has been recorded for the Lansing strain. It is impossible to say at present whether this difference is due to technical reasons—greater uniformity in virus activity and more rigid interpretation of the results—or to a more limited dissemination of the SK strain as an immunizing agent among human populations. While the actual percentage of positive sera was very low indeed, nevertheless the data follow a trend which has been firmly established by previous experience with simian strains of poliomyelitis virus; thus, the peak frequency of neutralization, i.e., about 10 per cent, occurred in a group of normal adult urban sera. Inasmuch as none of the sera examined here had been tested for virucidal power in monkeys, no basis exists which would allow a point for point comparison. It

may be of interest, however, in this connection to mention that one of the children included in the group of healthy contacts apparently carried active poliomyelitis virus as shown by the development of paralysis in one monkey following intracerebral injection with Duponol-treated feces collected from this individual. In spite of such proven carriage, no virucidal substances could be detected in the serum of this child.

Our observations relating to Theiler's virus harmonize with earlier reports to the extent that they confirm the inability of demonstrating the presence of any virucidal antibodies in normal human sera by intracerebral tests in mice. They differ significantly, however, from the current belief that such sera fail altogether to neutralize Theiler's virus, since definite neutralization occurred in about 9 per cent of all sera tested, provided the tests were carried out with the intraperitoneal method. The above figure represents the average from four individual series of tests. These series differed among themselves not only in technic (in series I, 3 mice were employed for each sample of serum as against 5 mice in series II-IV), but they were also subject to considerable variations (60-100 per cent) in the infectivity of the virus for controls. Had it been possible to standardize the test by using throughout virus of maximal potency with a uniform technic, an appreciably lower over-all percentage of neutralization would probably have been recorded. The data collected here, therefore, make no claim to be statistically valid. They seem to indicate, however, that a small fraction of normal human sera carry substances capable of inactivating Theiler's virus. The selectivity of this neutralization contrasts sharply with the regularity with which normal adult mouse sera neutralize the same virus.

Two alternate hypotheses suggest

themselves for the interpretation of the above data. One, that Theiler's virus may, on occasion, operate as a specific immunizing agent among human populations as it does so regularly among mice; the other, that the virucidal action of normal human serum is due to a nonspecific principle which acts in a similar manner on both monkey and rodent strains of poliomyelitis virus. Whatever the correct explanation, the findings reported here furnish additional evidence of the intrinsic relationship that exists between the various simian and rodent viruses that belong to the poliomyelitis group.

SUMMARY AND CONCLUSIONS

1. Among a total of 167 human sera, normal or convalescent, which were examined for their ability to neutralize SK murine poliomyelitis virus in intraperitoneal tests in albino mice, 11 were found to neutralize this virus. These neutralizing sera occurred all in a group of 102 normal sera obtained from urban residents.

2. A total of 30 normal human sera were examined for their ability to neutralize Theiler's virus of mouse encephalomyelitis in intracerebral tests in albino mice. None showed any neutralizing power.

3. Among a total of 100 normal human sera obtained from urban residents, which were examined for their ability to neutralize Theiler's virus in intraperitoneal tests in albino mice, 9 were found to neutralize this virus.

4. The significance of the above findings is discussed in the light of the available data on the neutralization of simian and murine strains of poliomyelitis virus by human sera.

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Wartime Health Education in Secondary Schools

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SECONDARY schools today have become the nation's most vital centers in the preparation of youth for wartime services. It is generally agreed that a basic part of this preparation should be to help youth to become physically and mentally fit for the rôles they will play as members of the armed forces, or as workers in industry, agriculture, and in community service. For those high school youth who already are engaged in wartime services the need is immediate and urgent. For youth in training for some future service, health preparation should become an essential part of the training.

In recognition of the need for increased attention to fitness of youth, the U. S. Office of Education, in the fall of 1942, called together two committees to consider the problems involved and to outline appropriate suggestions for action. These committees consisted of leaders from the fields of health education and physical education, and representatives from the Army, the Navy, the Public Health Service, the Children's Bureau, and the Office of Education. Out of the deliberations of these committees, two manuals were prepared. The first, *Physical Fitness through Physical Education for the Victory Corps*,¹ was published early in 1943; the second, *Physical Fitness through Health Education for the Victory Corps*,² has recently come off the press.

The first manual, as its name implies,

outlines physical education activities for high school boys and girls, especially adapted to wartime requirements. The program proposed in the manual was one immediate answer to the demands of the military services for young men who possess the "strength, stamina coördination, endurance, and agility" required for efficient performance, and even for survival, in combat duty. The strenuous physical activities outlined are for healthy boys and girls. As a guard against indiscriminate participation by those unfit for such activity, a carefully worded chapter was prepared by the Public Health Service on "Selection of Pupils for Training." As a guard, also, against any tendency to consider this a total physical fitness program, a section is devoted to a brief discussion of other phases of the school program which help in the development of physical fitness.

Since the physical education manual is now well known, discussion here will be limited to the considerations of the health education committee and the manual which was the outgrowth of these considerations.

The job before the Committee on Wartime Health Education for High Schools was clear. Six and one-half million young people are in secondary schools today, 6½ million pupils who are the nation's major source of war-time man power. What immediate action could the schools throughout the nation take toward producing "the

sound and well functioning bodies, the wholesome attitudes of mind, and good habits of living necessary to the development of physical strength and endurance and the specific knowledge and skills demanded of youth" today?

Obviously, more is needed than an expansion of health services and medical care programs, important as these are. Moreover, under wartime conditions professional health and medical services may necessarily be curtailed rather than increased. Yet here is a group of young people suddenly faced with adult responsibilities. The secondary school health program must be concerned not alone with doing something for them. It must give them opportunity to act for themselves—to develop in themselves a responsibility for their own health and the protection of the health of others. This is important not only in relation to general measures for health protection and improvement, but also as preparation for specific wartime services, whether civilian or military. High school boys and girls need experience in identifying sanely their own health problems, the health problems in their schools, homes, and community, and those in the services for which they are preparing. They need also experience in learning how to meet these problems intelligently. Sound health education is essential to accomplish these results.

This, then, was the task of the committee—to give what stimulus it could, through the medium of a wartime manual, to the development of more adequate and more dynamic health education in secondary schools in accordance with wartime needs. The committee, though focusing on the special contributions of the school, recognized that health education responsibilities in respect to secondary school problems must be "shared by all members of the school staff as well as by health departments, medical

groups, parents and others in the community." Fully as important, it recognized that no manual, however much it reflected the best thinking on a problem, could in and of itself be the magic wand which would effect health improvement. The desire for improvement and the will to act must be within the local communities themselves. A health education manual prepared for nation-wide use could at the most be only supplementary to local action. It could help direct attention to major problems in wartime, but even these vary widely in different sections of the country and in different communities. It could suggest specific courses of action to meet common problems, but here again the steps developed locally through coördinated planning are those which are likely to work best because of their local applicability.

The health education manual thus prepared within these recognized limitations is designed to serve as a curriculum guide for teachers, and as a source of ideas for administrators who are responsible for putting health education programs into action. Six major health objectives were selected for emphasis in the manual. They are: correction of remediable defects, prevention and control of disease, better nutrition, prevention of accidents, efficient daily routines and sound mental attitudes. There is nothing new in these objectives. They are as important in peace as in war. Certain aspects of each, however, when considered in a wartime setting have potential value in motivating young people for better health behavior. Consequently, for each objective pertinent information on the problem as it relates to high school youth in wartime is given, and "suggestions for action" which are in fact ideas that may be incorporated in a health instruction program by direct or integrated teaching.

An important section of the manual

contains suggestions for helping students meet health objectives for special wartime services. Material appropriate for use in preinduction training in health and sanitation for military services was contributed by the Army and Navy. Other material dealing with health problems now confronting youth in industry and agriculture was furnished by vocational leaders and by the Children's Bureau. A public health nurse was responsible for a chapter devoted to health preparation for community services, such as child care and clinic services and home care of the sick. No attempt will be made here to outline the content of the manual in any detail, for it would only be repetitive of the manual itself. Illustrations from the fields of nutrition, and of preparation for military services will suffice to indicate the type of emphasis given.

The significance of good nutrition as a factor in maintaining the nation's man power through its contribution to efficiency and health is widely recognized today. Less recognized perhaps is the part which high school students can play in a broad nutrition program. It was the committee's belief that student participation may be threefold: (1) improving personal nutritional status by following day by day the practices leading to good nutrition; (2) coöperating in the national and home food conservation program, and (3) assisting with such wartime nutrition programs as group feeding or school lunches.

Many high school students today are doing most of the family food shopping and cooking. Therefore, the committee felt that a practical health education program in the school should give students knowledge and training to assume this responsibility with efficiency. For example, students may design a meal record card to use in appraising their own or their family's eating habits.

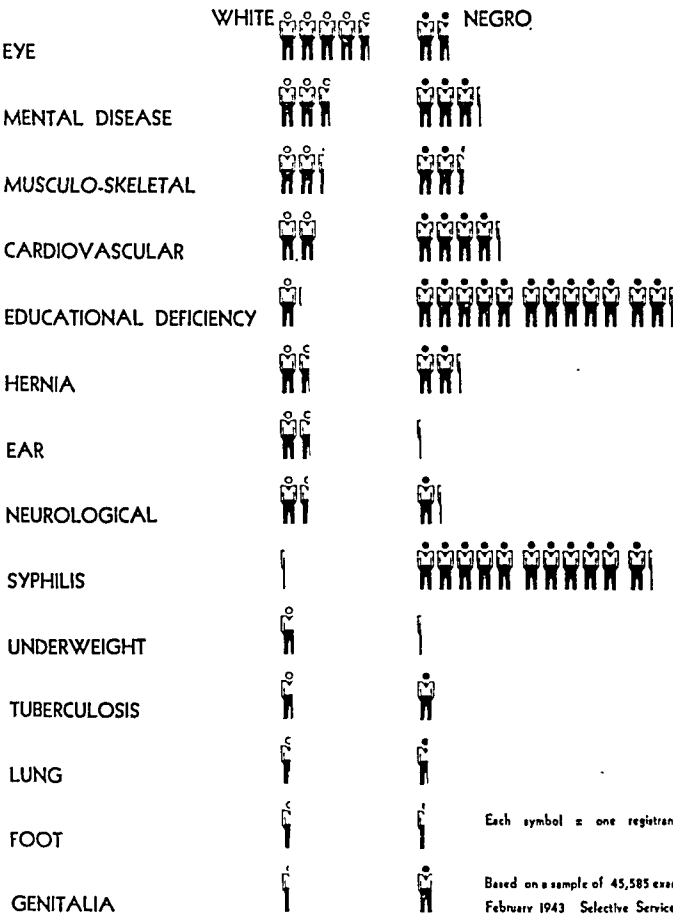
They may plan meals for members of the family working in the "swing shift" or the night shift, and they may demonstrate the packing of a suitable noon-hour lunch for themselves, for a younger brother or sister, or for a member of the family working in industry. An appropriate school or home activity for students living in congested war areas, or for those soon to be living on their own would be to plan and prepare simple meals that require minimum working facilities, little work space, and a limited amount of time. Activities like these, if intelligently carried out, will require careful study and research on food values and food requirements, and thus have real educational value.

In the nation-wide food conservation program high school students may find a thoroughly practical field for wartime service, the performance of which will contribute in a realistic way to their own, their family's, and the community's nutritional needs. Growing and using victory garden products; canning, drying, and storing foods; preparing foods to conserve their food value and learning how to buy wisely, are all tangible activities suitable for high school students. To illustrate, students may figure how to plan nutritious meals under rationing and with food shortages and find it as much of a game as the busy housewife does a puzzle. In some schools such projects are carried on through organized groups, as the Victory Corps, in recognition of the need at this age level for doing things together with others of the same age or interests.³ In the health education manual are found many suggestions for student participation in worthwhile nutrition projects such as these just described.

"The problems inherent in military life indicate that pre-induction training in health and sanitation will be of definite assistance. This opinion represents the thinking of military officers with field experience as well as those

**MAJOR CAUSES OF REJECTION AMONG
18 - 19 - YEAR - OLD REGISTRANTS
GENERAL MILITARY SERVICE**

Number of rejections per 100 white registrants examined compared with rejections per 100 Negro registrants



U. S. OFFICE OF EDUCATION

charged with training responsibilities. Time is restricted in the Army and Navy for the teaching of health. Consequently, any reinforcement which can be given to this instruction prior to entrance to military services will be of great aid."

Five fields of training as suggested by Army and Navy representatives are discussed in the manual. They are:

1. A knowledge of the body with emphasis on organs especially susceptible to disease and injury.

2. A knowledge of the common communicable diseases, and steps needed for group and individual protection against their spread. Development of a readiness to cooperate in disease control measures.

3. Development of attitudes and skills needed to prevent accidents and to give emergency care.

4. An adjustment to military life which will involve willing acceptance of responsibilities and cooperation with other men in all activities.

5. Intelligent action in respect to other problems of military hygiene that will result in protection and promotion of individual

health and in the maintenance of group health.

These fields, similar in many respects to the objectives outlined previously, were determined through an analysis of military needs, and represent a common denominator as valuable in the training of an infantry gunner as of a pilot. In certain services, such as the air corps or tank corps, special health training may be needed over and above the basic training, however.

The differentiated kind of instruction believed desirable as a background for those soon to enter the armed services can be well illustrated in connection with education in the prevention and control of disease. All high school students, the committee felt, need instruction in regard to such specific diseases as the common cold, tuberculosis, malaria, smallpox, syphilis and gonorrhea, typhoid fever and typhus, all of which may have special significance in wartime and an understanding of which will give concreteness and reality to the cause, spread, prevention, and control of diseases in general. As a part of preinduction training, however, additional problems particularly pertinent to military life need emphasis. These include: (1) understanding of conditions which exist at training centers and at the battle front that are conducive to the spread of infections; (2) understanding of measures taken to protect the men and women in the services and consideration of how one may cooperate in these measures; and (3) special responsibilities of the individual soldier or sailor on field service in such matters as purification of water supplies, sanitary disposal of body wastes and self-protection from disease-carrying insects. Many details in regard to such problems will wisely await instruction after induction. However, a degree of conditioning now should help create a willingness on the part of future

inductees to cooperate in the military health program. According to the committee, worthwhile experiences for the students while still in school may include assistance to local health departments in disease prevention and control activities, and also week-end field marches and camping trips under trained leadership during which principles of sanitation and personal conduct required of military men may be applied.

Another preinduction problem of major concern is the development in men and women of the ability to maintain sound mental attitudes in situations which are inevitable in military life. Young people need to learn how to face facts realistically and to become aware of situations they must meet, as well as of possible ways of adjusting to and finding their places in the armed services. This of course is equally important in civilian life. The times demand that young people grow up quickly. The school program as indicated earlier, must therefore provide opportunity for them to make decisions and take responsibilities. The health education manual contains many suggestions for ways of doing this in respect to the solution of health problems. Guidance counseling to help each find the place where he can most effectively serve in the war program is also essential. A recent Victory Corps publication⁴ deals with this problem in detail.

Administrative provisions generally recognized as essential for effecting a dynamic health education program were outlined in the manual by the committee. Briefly summarized they are:

1. *Fixing responsibility*—Acting on the belief that "what is everyone's business soon becomes no one's business," the committee recommended that in each school "one person be given the responsibility for coordinating all school health activities and for relating them to other health activities in the

community. The individual chosen for this task may be the school medical adviser or nurse, or the best qualified teacher available. Whoever is selected should be given time for this work and should have the support and advice of a school health committee.

2. *Providing time and opportunity for health instruction*—In order to accomplish this important wartime job of helping young people become fit, as well as of laying the foundation for future good health, there is great urgency for carefully planned instruction based on the needs and interests of the students. Students during the 9th and 10th grades need orientation in the high school health program. They need assistance in analyzing their own health problems and in working out plans for personal health improvement. During the 11th and 12th years they need, in addition, help in planning ways of living which will enable them to meet the demands of adult life, and now particularly to meet health and safety problems associated with military services, industry, agriculture, and community services. Direct health teaching, the committee believed, is essential in order to fulfil these responsibilities. Ample preparation, they stated, would involve 5 periods of direct teaching per week, or the equivalent, for at least one semester during the 9th or 10th grades, and a similar amount of time again during the 11th or 12th grades. In addition, implications for health teaching should be fully explored in all subject matter fields.

3. *Finding health needs and problems and providing follow-up procedures*—Teacher observations, special tests, and medical examinations all aid in discovering individual health needs, and form an integral part of a functional health education program. With a depletion of civilian medical and nursing services, more and more responsibility for this phase of the health program is already falling on teachers. This fact makes it important that they receive instruction on how to observe students for deviations from normal health. In follow-up procedures special attention should be given now to students seeking to qualify for particular wartime services. A boy with marked visual defects, for example, should be discouraged from preparing to be a pilot. Students attempting some form of war work in out-of-school hours will require close observation and supervision to make certain this work is not proving detrimental to their health.

4. *Providing a school environment conducive to health*—Physical conditions of the school plant as well as the emotional at-

mosphere of the school have an influence on student health. These receive emphasis in the manual, but will not be summarized here.

5. *Training of personnel*—One of the greatest obstacles to an effective health education program is the lack of adequately trained teachers. The committee, accepting the fact that many schools will not have specially prepared health educators available, suggests specific ways in which persons chosen for the task may secure additional in-service preparation. Further and more detailed suggestions are contained in a recently published report of another committee appointed by the U. S. Commissioner of Education to consider this problem. This report, "Preparation of Teachers for the Program of Physical Fitness through Health Education" appears in the June 15, 1943, issue of *Education for Victory*, the official bi-weekly publication of the U. S. Office of Education.⁵

6. *Community relations*—The health education manual ends with many specific suggestions for contributions to the health education program by community groups.

In health education no activities of the school can be thought of as apart from those of home and community. Joint action, carefully planned, is paramount in the improvement of student health. In this action the health department should hold a prominent place through helping schools determine the most significant health problems which education can help to solve and through making its technical services available to schools for consultative services on technical matters, and for in-service teacher training.

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Health Education in Action

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BEFORE April, 1942, Roberson Community, a typical rural Negro settlement in Bienville Parish, La., had barely utilized the services of the county health unit. Of the 55 families that made up this community, several had brought infants and youngsters to child health conferences; first graders had been visited annually by the Health Director for purposes of vaccination; some few had received typhoid vaccine, and a few others were undergoing treatment for syphilis. This constituted the total contact with the health unit. The majority of families were hardly aware of its existence. The fact that the health office was 40 clay-road miles distant, with only a part-time suboffice in the nearest town (6 miles away) did not help.

But one year later this same community had built its own health building, had someone from each family actively engaged in health work, and had changed the name of its school to include that of the new health clinic. The Roberson Colored School, center of community activities, is now known with pride as the Roberson Consolidated School and Health Clinic.

How was this change from comparative apathy to deep interest effected? Chiefly by drawing on the resources of the community itself and by accompanying every step of a planned health program with an educational campaign designed to make each community member "health-active" and "health-literate." Since this community is typical of many in the South, a study

of how this program was put into action may stimulate health efforts in similar groups, and is hence reported in some detail.

COMMUNITY BACKGROUND

Roberson Community is composed of 45 families, numbering about 300 people. The homes and farms spread over several square miles of cotton country, with a central church and school which serve as assembly-places for this closely knit group. The typical head of family is a share-cropper or small independent farmer who has lived all his life in Louisiana, most of it in this community. He has a family of 4 or 5, and rarely sees more than a few hundred dollars each year in cash. He may own a few chickens and have his own garden. Sanitary conditions are inadequate—no bathrooms or indoor toilets—screening in only six of the homes—water drawn from wells often poorly constructed—milk unpasteurized. This composite picture is based upon social studies made of each family, the details of which were painstakingly gathered on form sheets by the Executive Health Committee which was elected by the community.

GROUNDWORK

The health clinic project in Roberson Community was a direct outgrowth of a parish-wide observance of National Negro Health Week (April, 1942). It has always been our policy to work very closely with the schools, both negro and

white. Through them, we are able to reach every family. In addition, we have the coöperation of leaders trained in technics of education and publicity. We therefore requested the Negro supervisor of schools to call together the parish faculty members, and we suggested to them a variety of suitable activities to be initiated by the schools in each community for Negro Health Week.

Reports on the week's activities were sent in to the health unit by 40 of the 56 Negro schools in the entire parish. The following is a sample report from the high school attended by Roberson Community children, among others.

| | |
|--|----|
| I. Total communities participating | 10 |
| II. Total homes participating | 78 |
| 1. Cleaned house | 78 |
| 2. Cleaned toilets | 55 |
| (others needed repairs, and promised to make them) | |
| 3. Repaired and built window screens | 35 |
| 4. Repaired windows and built same | 36 |
| 5. Repaired and built steps | 43 |
| 6. Filled in low places | 44 |
| 7. Planted flowers | 60 |
| 8. Piled and hauled cans | 77 |

Assemblies and discussions on "Health and the War," exhibits and playlets, and health sermons in church were other activities. To stimulate further interest, each school (negro and white) was asked to submit a prize essay on Immunization. Parish awards of \$5 in War Stamps (donated by the local Tuberculosis Association) were given to the negro and white winners. Both essays were published in the *County Bienville Democrat*.

Interest in these various projects throughout the parish was so deep that we were encouraged to plan for a long-range program. We felt this could best be accomplished by a project in a selected community, using widespread publicity of its achievement as an incentive to other groups. Roberson Community was chosen because of its outstanding work during National

Negro Health Week. It had already laid the groundwork for a long-range program by setting up adult health committees.

THE PROJECT IS BEGUN

The adult health committees were asked to prepare reports for the Health Day exercises at church. Some of the topics covered were "Need for use of more milk," "House care in contagious diseases," "Home gardens and the war." As Health Director, I was invited to give the health sermon. I analyzed the local health needs, and suggested that the community plan with us a year's program of health activities. To engage the immediate interest of every member I proposed that the community build its own health clinic. Besides "interest" value, this would enable the group to receive more intensive services and would eliminate the long trip to the county health office. This suggestion was accepted with enthusiasm.

The school, as center of the community life, became the leading spirit in the program. The principal of the school and an elected committee of five undertook to design the plan for the clinic building and to raise the necessary funds. After the plans were approved by the Director of the Division of Health Education of the State Department of Health, volunteers from the community did the actual work of building. The committee decided to tax each member 50 cents. Since it knew intimately every family involved, greater leniency was shown to larger families and to those with lesser means. Fund raising was made the occasion for education on the need for and value of health services. Group meetings were held in the church; moving pictures were shown; families were visited individually by committee members when questions were answered. The few "contrary" members were con-

vinced. It cannot be overemphasized that this tax meant a real monetary sacrifice. Some of the farmers sold chickens to get the cash. A sum of \$75 was finally raised within the community. The balance needed (\$25) was secured from white people of the parish who were sympathetic to the project.

The clinic is a one-room structure, located near the church and school, in the cotton-fields, and easily accessible from the highway. Although it was not until March, 1943, that the building was completely finished, with glass windows and paint, it was sufficiently set up within 3 months after the Health Day exercises to be put to use.

HEALTH SERVICES FOR THE YEAR

No one in the community was able to afford *adequate* medical care, as we had discovered from our family studies. Therefore, health services were planned for all. Community leaders interested the members and secured their coöperation. The record of services for the year is a tribute to their resources of enthusiasm and coöperation.

The schedules for examinations and meetings were posted in advance in the health building, and announced throughout the school. Despite heavy cotton-picking time, clinics were well attended. The health unit personnel (2 nurses, 1 sanitarian, 1 secretary) assisted with the work, as needed. For a 2 week period the services of a physician from the State Department of Health were secured and those of a mobile dental unit promised. Examinations were accompanied by recommendation for correction, with request that appointment be made with private physicians where correction was needed. Tonsillectomies and adenoidectomies, however, were arranged for with Shreveport Charity Hospital at no charge to the community. Twenty-eight (all that were needed) were performed. As a

result of the tonsillectomies, 3 cases of hearing defect were also cleared up. The results of other activities of the unit are summarized in Table 1.

TABLE 1

Results of Work of Health Unit from April, 1942, to April, 1943
(Population of Community 300)

| | Per cent of Total Number |
|--|--------------------------------|
| <i>General Physical Examinations</i> | <i>Done</i> |
| Adults | 65 |
| Infants | 100 |
| Preschool children | 90 |
| School children | 92 |
| <i>Special Examinations</i> | |
| Chest x-rays (above 4 years of age) | 75 |
| *Wassermann tests on adults | 65 |
| Wassermann tests on high school students | 100 |
| Eye, ear, and dental examinations (children) | 100 |
| <i>Immunizations (Program for children only)</i> | |
| Smallpox | 100 |
| Typhoid fever | 91 |
| Diphtheria | 100 |
| Pertussis (infants under 1 year) | 92 |
| <i>Regular Health Supervision</i> | |
| Maternity cases | 90 |
| Infant and Preschool children | 94 |

* 100 per cent of clinical cases under regular treatment
10 wells, 12 privies, and 3 houses were improved or rebuilt.

VALUES OF THE PROJECT

The community attained a new level of understanding and interest in public health work. Each aspect of the program was used as an opportunity for clarification and education on such topics as immunization, serological tests for syphilis, prenatal care, etc.

The community developed a set of health standards and a respect and pride in its own capacity for achievement of specific health goals. The concrete acquisition of a central health building directed the health planning into long-range paths. The following

excerpt from "next year's plans" recorded by the school principal shows how much this group can now do on its own.

The committees are still functioning, along with another group that has been set up for this year. This latter committee is composed of school children located in different sections of the community, and we have 10 of them working in pairs, which make a total of 5 groups working the entire community. I have appointed them as leaders for their section. I have sub-divided the community into 5 health circles, and these girls will be busy, each pair in their respective districts trying to educate the people to the fact that it is necessary that they destroy all breeding places of flies and mosquitoes. We are giving prizes to the two girls who get the largest group of people to carry out these health objectives. Each two girls that are working together have 10 families or more under their care.

The interest of the white members of the parish was secured on the premise that health is indivisible; and that the health of any one family in a

community is necessarily the concern of all. Articles in the county paper, reports to the elected governing body of the parish, and coöperative planning with the school board promised interest in the project. The work of the local Red Cross in helping set up nutrition classes under the direction of Negro high school teachers, the request of the governing body for a report of National Negro Week activities; the donation of an award for the winning Negro essay on immunization, and the contributions made toward the health clinic building, all attest to the growing interest of the entire community.

CONCLUSION

From our work in this project we are convinced that there are many untapped resources of initiative, enthusiasm, and coöperation to be drawn on in both negro and white communities for successful health service and education projects centered on local needs.

Post-War Malaria Prevention by the County Health Department

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THERE are large areas of the United States which have had known cases of malaria only infrequently during the past twenty-five years. These areas gradually became rid of malaria due to a combination of circumstances. Better farming and the passage of the small water-driven mill, together with increased efficiency of medical attention, have been factors. However, the present war is bringing about conditions which make it imperative that these large areas of the United States be reexamined as to their potentialities for the spread of malaria.

The record of the last war gives us a lead as to what to expect during the course of and particularly following this war. During the last war very few American troops were engaged in any tropical territory. Our army fought in areas almost free of malaria and, as a consequence, we had no subsequent malaria problem. However, certain British and Russian troops fought in malaria infected areas. They took malaria to their homes, and the spread of the disease was recorded for the first time within the Arctic Circle in Russia.¹

In this war tremendous numbers of American troops are fighting in areas heavily infected with malaria. It is a distinct possibility that a large portion of the American troops who go overseas will spend at least some part of their service in tropical areas where they may well become infected with malaria. This being the case, it behooves those

of us in places where malaria does not ordinarily occur to be thoroughly familiar with the potentialities.

The first consideration is the possibility of the return to the United States of troops still harboring the malarial parasites. This brings up the question of the efficiency of the present treatments for malaria. There are three drugs of value: quinine, atabrine, and plasmochin. These drugs admittedly do not give us adequate control over the disease. Relapses are frequent and unpredictable.

A good illustration of the fact that troops do and will return still harboring the malaria parasite is the experience at the Moore General Hospital at Swannanoa, N. C., which is about six miles from Asheville. In a small contingent of injured troops returning from the South Pacific, 42 men had malaria infection as shown by blood smears.² These 42 cases were distributed according to type as follows: *P. vivax*—30, *P. falciparum*—3, *P. malariae*—1, and unidentified or unclassified—8. Twenty-six of the 42 men had attacks while they were at Moore General Hospital. Ten of this 26 had their first attack while they were here. One additional soldier had his first attack while enroute two days before arrival. The remaining 15 attacks represent relapses. It is interesting to note that in one of the cases of *P. vivax* infection the individual had his first attack 4 months after leaving the South

Pacific. Thus in a small group of soldiers, 42 were infected with malaria and 26, or more than half, had either their first attack or a relapse after reaching this country. In fact, there was an average of 4.5 relapses per patient. One patient has already had 12 relapses. If this is a sample of what will occur in the remainder of the war, it will be a small county indeed which will have as few as a hundred cases of malaria among returning soldiers.

The second condition, and perhaps the more important one, is the potential means of spread of malaria from the infected reservoir to the general population. It is at this point that the problem demands the close scrutiny of the health department. Even though his estimate may be in error, the health officer owes it to himself and to his community to make an estimate of the potential danger in his community. For his own protection he should make this estimate a matter of record and present it to his local board of health.

Before going into detail in the discussion of this estimate, it might be well to consider one additional factor present in areas where little or no malaria has occurred in recent years. That factor is the lack of familiarity of the practising physicians with the disease of malaria. Lest it seem far-fetched to think that physicians might not be on the watch for this disease, let me cite an example. A relative of mine was trained as a laboratory technician in a part of the South where malaria is not uncommon. Later she was employed in a large New York hospital where she became ill. She had the usual attacks of chills, fever, and prostration. Numerous specialists were called in, but none made a diagnosis. During her periods of prostration she was completely out of her head. In between her attacks she called for a microscope and blood smear and made her own diagnosis. As it happens, she

contracted malaria in the New York harbor while visiting friends aboard a boat which had just returned from the Caribbean. She was bitten by a mosquito on this boat.

In making a survey of any area it is necessary to have exact knowledge concerning the distribution of mosquitoes in that area. Mosquitoes, of course, cannot spread malaria unless infected persons are present. In most of the areas under consideration, malaria was greatly reduced, if not eliminated, by the reduction in the number of mosquitoes. In recent years, however, there may have been a great change in the mosquito population without being reflected in cases of malaria. The only way to be sure is to make an actual field survey. The U. S. Public Health Service has sufficient entomologists to aid the local health department in making the primary survey and to give the local personnel sufficient knowledge so that they can carry on the needed follow-up work.

In the case of Asheville and Buncombe County, North Carolina, the problem has come more quickly than in most places. We have a 1,500 bed Army hospital in the Moore General Hospital at Swannanoa. The Navy is represented by a convalescent hospital designed to care for an additional 500 men. A branch of the Army flight control is located in Asheville. Certain personnel of this branch go to and from tropical areas frequently. Additional facilities for convalescent military personnel are in prospect. Thus, while only 42 known cases of malaria have been imported into this county, the probability is that many more will come.

Three additional pertinent facts were known to the local health department. The medical staff at the Moore General Hospital reported that they had found *Anopheles* mosquitoes in the vicinity, and several years ago 10 cases of ma-

laria were definitely known to have been contracted locally following the importation of one case from Eastern Carolina. Mortality records for Buncombe County are available from 1919 to 1943. While no deaths from malaria have occurred since 1937, there were 13 deaths from this cause between 1919 and 1937. Seven of these occurred between 1933 and 1937. Thus the possibility of the spread of malaria was definitely realized.

An entomologist from the State Board of Health spent several days on two occasions with the Health Department investigating the probable future problem. The survey included the search for adult mosquitoes as well as breeding places. Needless to say, the local personnel had never had occasion to look for *Anopheles* mosquitoes. It was pointed out that the *Anopheles quadrimaculatus* was the only mosquito in this area likely to spread malaria, and the identification of this mosquito was explained in detail. Likely resting places of adult mosquitoes were inspected in all parts of the county. Numerous culverts, bridges, stables, and pig pens were carefully gone over. As is well known, the *Anopheles* mosquito seldom flies more than a mile from its breeding place. Consistent with this knowledge was the finding of adult mosquitoes within a mile of certain lakes and nowhere else. It is perhaps significant that the 10 cases known to have been contracted in this county during 1936 all lived within less than a mile of one of these lakes. Repeated visits to this particular lake have never failed to show the presence of *Anopheles quadrimaculatus*.

Numerous dippings were made in still waters along creeks and in various lakes. Many *Anophelene* larvae were found, some of which turned out to be *Anopheles quadrimaculatus*. Since the differentiation between the larvae of the various species of *Anopheles*

mosquitoes is rather difficult, it was decided to send any later collections of *Anophelene* larvae to the State Board of Health for final identification.

The climate of the particular community under consideration must be taken into account in making the survey. The mountain waters around Asheville stay sufficiently cold to prevent much mosquito breeding until the latter part of June. Monthly inspections are to be made each year at numerous scattered points throughout the county from the latter part of June until the end of the breeding season, which is usually about the first of October. The night temperatures during September range as low as 36°, thus definitely limiting mosquito breeding. More frequent inspections are being made in areas where *Anopheles* mosquitoes are known to exist.

Definite action is being taken in the two places where the *Anopheles quadrimaculatus* has been found. As it happens, these two places are in localities frequented daily by military personnel. One place is within 400 yards of the Moore General Hospital, and the other is adjoining the municipal recreation park. A combination of oiling and variation of the water level of the lakes is being used.

This survey has shown the local health department some interesting things. Six major lakes and two pools were known to the Health Department before this survey was made. In going over the county with mosquito breeding in mind, three additional small lakes and four areas where water collects in wet weather were found. A practice which is growing in popularity is the making of small fish ponds to grow edible fish. Several of these were found with considerable vegetation around the edge. As it happens, no mosquitoes were found breeding in these fish ponds, probably because of the fact that the mountain waters feeding them usually

stay at a temperature of about 50° F. These fish ponds are potential menaces, however, and do cause trouble in other sections of North Carolina.

SUMMARY

1. It has been shown that there is an almost certain possibility that troops infected with malaria will return to all sections of the United States. It is very likely that there will be numerous infectious relapses among these men.

2. The need for a resurvey of the potential malaria spreading mosquito population was shown. It was pointed out that large changes in the mosquito

population, both as to numbers of mosquitoes and types, are possible in many areas without being reflected in increased cases of malaria.

3. The method of making a survey consists in looking for both adults and larvae of *Anopheles* mosquitoes. Expert help will be needed in areas where mosquito control has not been necessary in recent years.

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Removal of Poliomyelitis Virus from Sewage by the Activated Sludge Process and the Separation from Sludge of an Antibacterial and Antiviral Substance

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IT was reported in a previous communication that activated sludge as used in sewage disposal processes largely removed poliomyelitis virus from the supernatant liquor. Sludge in amounts of 1,100, 2,200 and 3,300 p.p.m. at 6 and 9 hour aeration periods, removed the virus sufficiently from the supernatant to make it almost completely noninfective when injected intracerebrally into mice.¹ The present report describes the separation from activated sludge of an antibacterial and antiviral substance.

SEPARATION OF AN ANTIBACTERIAL AND ANTIVIRAL SUBSTANCE FROM ACTIVATED SLUDGE

Antagonistic relationships¹⁴ between different types of microorganisms have come recently into prominence. Fleming¹⁵ and others¹⁶ have found an active substance in the filtrate of cultures of *Penicillium notatum*, which is active against many Gram-positive organisms both *in vitro* and *in vivo*. Dubos¹⁷ isolated an enzyme from soil bacteria which was active against the pneumococcus and other Gram-positive or-

ganisms. Later Dubos and coworkers¹⁸ produced a specific antibacterial compound in crystalline form from spore-forming bacteria. It is possible that there may be such antagonistic relationships between organisms in sewage and the agents in activated sludge mixtures. *Eberthella typhosus* and *Salmonella paratyphi* have been observed¹⁹ to exist only a short time in sewage sludge, while a reduction of 99 per cent in the numbers of these organisms was noted to occur in activated sludge after 6 hours' treatment.²⁰

As noted above, poliomyelitis virus has been found to be removed or destroyed in sewage by the activated sludge process. The separation from sewage sludge (mixed liquor) of a substance with antibacterial and antiviral activity is herewith described.

PREPARATION OF EXTRACTS

Fresh activated sludge and return sludge were obtained from the local sewage treatment plant. These materials were collected in sterile 4 liter containers and brought immediately to the laboratory.

Numerous preparations derived from dried activated sludge were made through extraction with various solvents, but all proved ineffective when tested for bactericidal and virucidal activity. Wet activated sludge was tried in a similar manner, again with negative results.

In the second phase of the study, fresh activated sludge was incubated at 37° C. for varying periods. In some samples, the effluent or supernatant was transferred to suitable containers and incubated separately. The settled solids (floc) were used to fortify other samples. The sludge was thoroughly mixed for 15 minutes to obtain an even suspension before being transferred to flasks for incubation.

The time necessary for the development of maximal antibiotic effect was found to be approximately 100 hours' incubation at 37° C.

At the end of the incubation period, the effluent was siphoned off into 250 ml. centrifuge bottles and centrifuged at 3,000 r.p.m. for 30 minutes. The supernatant, free from particulate matter, was transferred in 100 ml. amounts to separatory funnels. To each was added 15–20 ml. of ethyl ether and the funnel was then shaken for 3 minutes. After the period of agitation, three layers separated, an ether layer, an aqueous layer, and a jelly-like interphase layer. The ether layer was found to contain an active substance and was designated Extract A. This material, from which the ether has been removed by evaporation at room temperature or at 50° C., was called Extract C.

Extractions were made with chloroform (Extract B) in much the same manner as with ether. Evaporation of chloroform was accomplished at 85–90° C. in a water bath.

Samples of ether extract (C) were taken up in a 2 per cent sodium bicarbonate and then neutralized with acid (5 per cent acetic) to a pH of 7.0 (Extract D).

Each of these 4 types of extracts, ether (A, C, D) and chloroform (B) was tested for antibacterial properties, and the two ether preparations (A, D) were tested for antiviral activity.

METHOD OF TESTING ANTIBACTERIAL ACTION

The concentrated ether extract (A), the chloroform extract (B), ether extract residue (C), and sodium bicarbonate treated residue (D) were tested for antibacterial properties as well as were similarly prepared extracts of two bacterial cultures, *Escherichia coli* and zoögleal.

Twenty-four hour broth cultures of recently isolated strains of *Staphylococcus aureus* hemolyticus and *E. coli* were seeded to nutrient agar plates. Sufficient numbers of organisms (0.3–0.6 ml. of broth culture) were used so that a 24 hour incubation gave growth that masked the plate. The surface of the agar was allowed to dry in air for 15–30 minutes to remove all visible moisture.

The extracts were placed directly on the top of the seeded agar. Several drops (2–3), Extract A, B, were allowed to evaporate before the Petri dish lid was replaced. Extract C taken up with nichrome loop was also placed on the seeded agar surface. The amount taken up was that portion that remained on the edges of the nichrome wire. These plates were incubated at 37° C. for 24 hours and inhibition areas were noted.

The amount of antibacterial substance present was indicated by the degree and extent of inhibition. The presence of an active substance would be indicated by complete inhibition or destruction of the growth of all organisms on the exposed area through the depth of the agar. Fanning out of the inhibition zone from the exposed area could be recorded in terms of cm. of inhibition.

METHOD OF TESTING ANTIVIRAL ACTION

A strain of poliomyelitis virus adapted to mice was used. Inoculations were made intracerebrally in amounts of 0.03 ml. of virus suspension (1:300) unless otherwise stated. Mice were observed at least once daily for paralysis or other evidence of illness. All groups were observed for a period of 30–40 days following the inoculations before the protocol was completed. The original virus suspension was obtained by removing the brains and the cords of mice paralyzed in two or more extremities. These were ground in refined silica and suspended in sterile broth. After centrifugation for 5 minutes at moderate speed, the supernatant (1:5) was removed and used as virus concentrate from which dilutions were made.

In Experiment I, Extract A was mixed with virus to yield a 1:300 virus suspension. This extract-virus mixture was thoroughly shaken and placed in the refrigerator for 2 hours. Ten minutes before the end of the test period, it was again thoroughly mixed. The aqueous layer was then inoculated intracerebrally into mice. Another portion of the virus suspension was treated with ether in a similar manner to serve as a control.

In a second experiment, smaller amounts of Extract A were mixed with the virus suspension and the contact period was increased to 18 hours. The amount of Extract A used was 10–15 per cent of the total virus suspension. After the addition of Extract A to the virus suspension, it was shaken gently for 30–45 minutes, following which it was placed in the refrigerator for 18 hours. The aqueous layer was then removed aseptically for intracerebral inoculation into mice.

Aeration is part of the activated sludge process of sewage treatment, and it was thought that this might be necessary to enhance the activity of an

antiviral substance derived from sludge. With this in mind, Experiment III was set up using Extract D. Extract D was mixed 1:1 with the virus in three portions. To the first was added a minute amount of 30 per cent hydrogen peroxide (Superoxol). The second tube was aerated by passing air through the mixture for 4 hours. The third tube contained only the mixture of Extract D and virus suspension. The first and third tubes were placed for 2½ hours in the refrigerator while the aerated tube remained at room temperature. Controls employing virus suspension alone and virus plus an identical amount of 30 per cent hydrogen peroxide were also included. The lack of virucidal effect of aeration had been previously demonstrated.

DESCRIPTION OF THE EXTRACTS

The residue, Extract C, obtained when Extract A was evaporated, was a dark brown oily substance having a distinct, pungent odor. It was soluble in ether and chloroform but not in water. A faint yellow color was present and increased in intensity with concentrations.

Extract B appeared colorless, possibly due to the small concentration obtainable in chloroform. When Extract B was evaporated to dryness, minute amounts of oily residue were observed which had the same characteristic odor as Extract C. The material appeared to be thermostable since the separation of the Extract B was made at a temperature of 85–90° C. for 30 minutes.

A crystalline material has been separated from Extract C on several occasions. The antibacterial but not the antiviral properties of these crystals have been tested.

RESULTS

Antibacterial Tests

The ether extract (A and C) when placed on the surface of heavily seeded



FIGURE 1—Antibacterial Action of Extract A



FIGURE 2—Antibacterial Action of Extract C

agar plates, destroyed all the organisms in the areas exposed through a depth of $\frac{1}{8}$ in. or more of agar (see Figures 1 and 2).

In Figure 1, the ether extract (A) of the effluent from activated sludge was placed on the surface of the seeded agar. The area of inhibition is apparent. The residue precipitated on the agar within the inhibition area appears as a light grayish material. No growth of organisms was observed below or in the inhibition zone. Figure 2 depicts the action in two areas of the plate of the residue, Extract C, which was placed on the surface by a nichrome loop. The original inoculum was placed directly in the center of the plate and appears in the figure as a light line in the inhibited zone. The loop was again placed on the surface to the left of the original contact and appeared as a slight line in the inhibited zone.

The bactericidal activity of the substance appeared to penetrate into the agar. The zone of penetration was directly proportional to the amount placed on the agar surface.

Extract B gave similar results but the degree of inhibition was not as pronounced as that of Extract A. The inhibition was in the area exposed, with

penetration only partially throughout the depth of the medium used ($\frac{1}{8}$ in.).

The crude substance, Extract C, and the ether extract (A) appeared to be slightly more active against the Gram-positive organism than against the Gram-negative organism though there was definite inhibition of both.

Controls of ether and chloroform were used in all experiments in place of the corresponding extracts with no inhibition of growth taking place.

The antibacterial action of Extract D was not as pronounced as was the effect of Extracts A and C. Surface growth was inhibited but there was only partial penetration into the seeded agar.

Greater amounts of the substance were found in effluents in which extra quantities of activated sludge floc had been incubated than in the effluents incubated without floc. Similarly prepared extracts of *E. coli* and of zoögleal organisms did not appear to contain the antibacterial agent.

Antiviral Tests

Paralysis in one or more animals in any test group was deemed to be indicative that the virus had not been destroyed by the extracts. Animals

dying 1 to 3 days after inoculation were considered to have died from trauma or interfering toxic substances.

The results of all the tests for antiviral action on poliomyelitis virus are shown in Table 1.

paralysis, and 6 died without paralysis being observed. Three deaths occurred within 2-4 days after inoculation. In the control groups receiving virus treated with corresponding amounts of ether, of 20 animals, 8 were observed

TABLE 1
Antiviral Activity of Sludge Substance

| Exp. | Mice Number | Virus Dilution | Form of Substance | Contact Period Hours | Results | | | Miscellaneous |
|------|-------------|----------------|-------------------|----------------------|---------|-----|-----|-------------------------------------|
| | | | | | P | D | Dis | |
| I | 20 | 1-300 | Extract A | 2 | 1 | 5 * | 14 | 1:1—Virus+Extract A |
| | 20 | 1-300 | | 2 | 10 | 3 | 7 | Control—Ether Treated |
| II | 21 | 1-250 | Extract A | 18 | 3 | 6 * | 12 | Ext. A used 15% of Virus Suspension |
| | 20 | 1-250 | | 18 | 8 | 4 | 8 | Control—Ether Treated |
| | 16 | 1-250 | | 18 | 9 | 2 | 5 | Control—Nontreated |
| | 14 | 1-5 | | 18 | 8 | 6 | 0 | Control—Nontreated |
| | 30 | 1-300 | | 2½ | 10 | 4 | 16 | 1:1—Virus+Extract D |
| III | 30 | 1-300 | Extract D | 2½ | 0 | 2 | 28 | Virus+Substance+Hyd. Peroxide |
| | 30 | 1-300 | Extract D | 4 | 1 | 1 | 28 | Aerated Mixture |
| | 30 | 1-300 | | 2½ | 10 | 3 | 17 | Control—Virus+Hyd. Peroxide |
| | 30 | 1-300 | | 2½ | 13 | 3 | 17 | Control—Nontreated |
| | | | | | | | | |

P = Paralyzed

D = Died without Paralysis

Dis = Discards

* See Explanation in Text.

In Experiment I (Table 1), of 20 animals receiving virus suspension that had been in contact with Extract A for a 2 hour period, 1 animal was observed with paralysis, 5 died without paralysis being observed, and 14 remained alive. Four of the deaths occurred within 3 days after inoculation and were thought to be due to trauma or toxicity as the one animal developing paralysis did so only after 18 days' incubation. In the control group, of 20 animals receiving an ether treated virus suspension, 10 were observed with paralysis, 3 died without paralysis being noted.

In Experiment II, the length of contact between Extract A and the virus suspension was increased to 18 hours and the amount of extract was reduced to 15 per cent of the volume of the virus suspension.

Of 21 animals receiving the treated virus suspension, 3 were observed with

with paralysis while of the control animals receiving virus alone (1:250), 9 were observed with paralysis. Of the controls receiving the 1:5 virus suspension, all became paralyzed or died. The extract as used in this experiment seemed of little effect.

Extract D was prepared in order to try to increase the solubility of the material and hence to insure more thorough contact with the virus. Constant shaking and agitation was not employed when Extract D was used. The results of the action of Extract D against the virus are shown in Experiment III, Table 1.

Of 30 animals receiving Extract D-virus mixture, 10 were observed with paralysis, and 4 died without paralysis being observed. When hydrogen peroxide was added as a source of oxygen with Extract D-virus mixture, no animals, of a group of 30, were observed with paralysis and 2 died

without paralysis. Of the 30 mice used in the control group in which the virus was exposed to the same amount of hydrogen peroxide, 10 animals were observed with paralysis, and 3 died without paralysis. In the aerated Extract D-virus mixture, 1 animal of 30 was observed with paralysis, and 1 animal died without paralysis being observed. Aerated virus suspensions were not included as controls in this experiment, as aeration for long periods had previously been shown not to affect the virus. The untreated control (1:300 virus suspension) caused paralysis in 13 mice, with 3 mice dying without paralysis.

While it seemed that some antiviral effect was exerted by the ether extracts, much clearer results were observed when the ether extract residue treated with sodium bicarbonate was used in the presence of oxygen or aeration.

SUMMARY

The activated sludge process of sewage treatment in aeration periods of 6-9 hours has been found to remove or to destroy poliomyelitis virus. Efforts to separate from the sludge (mixed liquor) an active principle have yielded a substance which exhibits antibacterial and antiviral action. The yield of the substance is increased by incubation of sludge.

The substance is soluble in ether and chloroform and is relatively insoluble in water. It appears to withstand a temperature range of 4°-85° C. without denaturation.

The material was found to have antibacterial properties when placed in direct contact, on a seeded agar plate, with organisms both Gram-negative and

Gram-positive. Activity was diminished when the crude substance was treated with sodium bicarbonate and subsequently neutralized to pH 7.0.

The material in the form of an ether extract appeared partially to inactivate a mouse-adapted poliomyelitis virus. The ether extract residue treated for brief periods with sodium bicarbonate and subsequently neutralized seemed almost inert, but the activity of this fraction was enhanced by the presence of oxygen or by aeration.

The source of the material has not been determined but it is apparently not produced by *E. coli* or zoögleal organisms.

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The Public Health Significance of the U. S. Cadet Nurse Corps

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THE country's nursing shortage must be attacked as a production problem. As essential to the war as are planes, guns, and ships, the nurse is a guardian of the national health and the welfare of our fighting men.

Passed unanimously by the Congress in June of this year, the Bolton Act is keyed in its administration to the production of more nurses in a record period of time. The production goal for 1943 has been set as 65,000 new student nurses.

To provide the same amount of nursing care per patient in 1944 as in 1941, 115,000 new students would have to be admitted to schools of nursing this year. The compromise number, 65,000, was necessitated by the realities of the situation. This figure is a minimum which must be met unless the machinery of the nursing services is to break down. By whatever number the goal is surpassed, hospitals and public health services will benefit in direct proportion. If the goal is not met, every hospital and public health service will feel the pinch more this year and even more next year.

Public health services are vitally concerned with the adequacy of nursing care in hospitals. The public health of the nation depends upon proper medical and nursing care. This care is a basic consideration in maintenance of the public health.

Most of the 1,300 nursing schools, or production plants, in the country are operated by hospitals. A complete business cycle is represented in this system of operation. The hospital is the owner and operator of the plant and among the chief consumers of the product, which is the graduate nurse, and of the by-product, the student nurses' services. Hospitals without nursing schools are dependent on the 1,300 manufacturing plants. The success of the 1,300 schools in meeting the 65,000 goal will have a very direct bearing on the continuing existence of some of the 6,500 hospitals and of the continuing services of many.

During wartime, the federal government becomes a large consumer of nurses and leaves the hospitals with a shortage. Also, the government is concerned with the public health on the home front in its application to industrial production and its effect on the morale of the armed forces. As a consumer, necessarily concerned with the output, the government, through Congressional action, has stepped in as a financial investor in the nurse production plants.

In giving financial assistance in the production of nurses, the government has found it wise to use existing schools operating their own policies. The schools are responsible, under the Bolton Act, for admitting more students

and preparing them in shorter time. Production in the U. S. Cadet Nurse Corps of the same quality of nurses as before should evolve from this acceleration. Educational standards will be maintained.

Under the accelerated training programs required for the Corps by the Bolton Act, all essential instruction and experience must be condensed into 24 to 30 months. An extra 6 to 12 months of supervised practice is provided if required for registration by the state or for graduation by the school. This additional time is known as the Senior Cadet period.

The Senior Cadet may be transferred to a civilian hospital, federal hospital, public health agency, or may remain in the "home" hospital to replace a graduate nurse.

Public health and visiting nurse services will benefit directly by procuring Senior Cadet nurses, who have received full classroom and clinical experience and are available for full-time practice under supervision. It should be understood that the type and kind of supervised experience must be acceptable to the home school and the State Board of Nurse Examiners. Public health agencies, desirous of procuring the services of Senior Cadet nurses, should deal directly with the nursing schools in their areas.

On reaching the senior period, Cadets leave the ranks of students and make way for new students. Production will be increased through accelerated programs only if the Senior Cadet is removed from the school's housing and educational facilities. Retention of the Senior Cadet in the school would be comparable to the clogging of an assembly line with completed planes for six months.

Thus, shortening of the time element is the first step toward achievement of wartime production. Raw material to feed the processing machine must be

amassed next to make the speed-up economically sound. The U. S. Cadet Nurse Corps recruitment program is progressing very satisfactorily. By the end of September, almost 800 schools of nursing had been accepted into the Corps program. Approximately 80,000 students in these schools were expected to join the Corps, with about 41,000 of that number new students. More applications are being approved every day.

Recruitment has been supported by national, state, and local nursing councils, schools, hospitals, and others interested in the nursing profession. Information centers have been established in all hospitals to provide candidates with material on the Corps and on schools of nursing.

Acceleration and recruitment by themselves will not accomplish the production goal. They must be accompanied by expansion of educational facilities. As a beginning, existing facilities must be used to their greatest capacity, a capacity which is greater than many schools have yet recognized. Then, many schools have one bottleneck service which hinders maximum output. These must be removed by affiliation. Schools participating in the Corps must provide clinical experience in surgery, pediatrics, obstetrics, and medicine. Additions of a psychiatric affiliation by every school in the country would produce a 10 per cent increase in student enrollment in the year, if at the same time, the nurses' residences were kept filled. By negotiating new affiliations, the school improves and increases nursing services for its own patients and provides nursing service in the affiliating institution. Obviously, nursing care in psychiatric institutions would be greatly improved and the graduate nurse would be better prepared for the future. Other affiliations such as public health nursing and

communicable diseases offer parallel advantages.

Insufficient housing facilities must not be permitted to curtail student enrollment. Just as the factories of the country have met wartime demands, so the schools of nursing must avail themselves of every facility. They must expand their physical boundaries if necessary. Financial assistance for new construction or for alterations on a leased or purchased building may be secured quickly from the Federal Works Agency through the Lanham Act.

Schools are faced with still another impediment to expansion in the shortage of instructional personnel. The shop foreman is indispensable in the factory. The nurse educator must be considered in the same light. She should not be hindered by administrative or clerical work. Her efforts should be rewarded by ample salaries and recognition. Non-nurse instructors should be used as much as possible. Schools might pool personnel. Married nurses could work on a part-time teaching basis. Senior Cadets may act as assistants to nursing arts and clinical instructors.

All-expense scholarships in nurse education courses at colleges and universities have been made available through Bolton Act funds. Nursing schools have been urged by the Division of Nurse Education, U. S. Public Health Service, administrator of

the Corps program, to choose graduates to study for advanced positions and return to the "home" school to teach.

It is apparent, therefore, that all of these bottlenecks on the production front can be solved. The goal can be reached.

Great progress has been made in the program since the appropriation became available on July 16. Rules under which the Bolton Act is administered were formulated by an Advisory Committee, meeting with Dr. Thomas Parran, Surgeon General, U. S. Public Health Service. Represented on this committee were hospitals, nursing schools, universities; medical, administrative, and nursing professions.

The program has been publicized widely in all media of expression. Great credit is due the State Boards of Nurse Examiners for their work in liberalizing admission requirements, aiding in acceleration programs, recruiting students, and in placement of Senior Cadets. Coöperation in these problems has also been given by state and local nursing councils.

Success at the outset of the program has been realized. Now we must look to the future. There is more work to be done before the nurse shortage problem is solved. Continued coöperation by all professional groups is necessary to the success of the program. We cannot afford to fail.

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A PROPOSED VITAL RECORDS ACT (S. 1096)

THIS bill, introduced in May, 1943, brings to focus a long and detailed discussion of vital records and statistics. In effect, it provides for transfer of the functions of the Division of Vital Statistics, Bureau of the Census, to the U. S. Public Health Service, and for expansion of these functions. The objectives of the bill are stated as being "for the purpose of coördinating the vital records and vital statistics offices of the State into a coöperative vital records system, including improvement of the registration procedures of such States for the purpose of guaranteeing complete and accurate registration, preservation, and availability of certificates and related records of births, deaths, marriages, divorces, legal separations, annulments, changes of name, adoptions, and legitimations within the United States." It would create, in the Public Health Service, a "Bureau of Vital Records which shall be under the immediate supervision of an Assistant Surgeon General." Very wisely the bill specifically provides that "Nothing contained in this Act shall be construed to modify or supersede in any way the powers, duties, and responsibilities of the various States for the registration of vital statistics."

A full discussion of the background of this proposed legislation can be found in a Message from the President, published as *House Document 242, 78th Congress, 1st Session*. This document, incidentally, is an excellent text on vital records and among other things contains the Report of the Commission on Vital Records, Office of Defense Health and Welfare Services, and the Report of the Vital Records Committee of the Association of State and Territorial Health Officers. Here appears, too, a Report of the Bureau of the Budget Relating to Vital Records and Vital Statistics. All these emphasize the desirability of focusing federal activities in vital records and statistics into a single agency, the need for strengthening and coördinating federal, state, and local activities in this field, and the necessity of enlarging their scope.

The bill in question is designed to do these things, and there appears not to be that type of opposition which was encountered when the Committee on Public

Health Organization, White House Conference on Child Care and Protection, called by President Hoover, recommended in its majority report that certain health activities, scattered in the federal government, be transferred to the Public Health Service. Some of those recommendations created such violent emotion and opposition that Mr. Hoover is to be pardoned for indicating that he was sorry he ever raised the question. Since then the Public Health Service has itself been lifted out of its ancient but anomalous position in the Treasury Department and is now a part of the Federal Security Agency. There it continues its excellent work but we suspect that at times its more grizzled veterans must wonder about some of the strange fellows with whom they are now bedded down.

Even though there is general concurrence that the objectives of S. 1096 are sound, there are certain elements of the bill that need careful scrutiny and, we feel, revision. For example, while the functions of the Division of Vital Statistics of the Bureau of the Census would be transferred to the Public Health Service, the direction of the new Bureau of Vital Records in that Service would be under an Assistant Surgeon General rather than the Surgeon General, thus: "The Assistant Surgeon General [not the Surgeon General] is authorized," "the Assistant Surgeon General shall compile," "the Assistant Surgeon General shall provide . . ." Occasionally, there is reference to "approval of the Surgeon General" but this relates essentially to fiscal procedures. Such tricky tongue-in-the-cheek legislative expressions will tend to defeat what the bill states is its purpose, for organization is jeopardized and administrative confusion assured whenever a subordinate has authority and responsibility neither delegated to him by his chief nor possessed by that chief. If the Public Health Service is to be responsible for federal activities in vital records and statistics, then it is not only desirable but essential that full authority for this activity be vested in the Surgeon General and not in a subordinate. The present bill's ambiguity in expressing this intent constitutes what, in less refined circles, might be designated as double-talk.

Another questionable feature is that the bill would create a "Bureau of Vital Records" in the Public Health Service. It is to be remembered that the principal administrative units of the Public Health Service are *Divisions*. It is difficult to appreciate the necessity for making this new activity a *Bureau*, which administratively is of higher caliber than a Division. Other important services function satisfactorily and on a par with each other as Divisions, and while the Public Health Service might in future profit by reorganization of its structure, there seems no good reason why this new activity should administratively dwarf others to the detriment of the whole. Granted that Vital Records and Statistics are important, so are the Divisions of Scientific Research and States Relations, and Venereal Disease Control.

One must commend this attempt to improve federal activities in vital records and statistics, and must approve an effort to place these functions, administratively, under the principal health agency of that government. One cannot, however, look with equanimity on legislation which by its very language promises deformity of organization and difficulties in administration. If autonomy and isolation of vital records activities are the prime considerations, then keep such activities in the Bureau of the Census; if they are to be placed in the Public Health Service, put them there and have done with it.

Senate Bill 1096 is badly in need of revision.

POLIOMYELITIS REMAINS AN ENIGMA

SOME five years ago Lumsden, who is a hard-bitten epidemiologist of the realistic school, active in field work and incisive in his thinking, presented a paper entitled *Poliomyelitis: Facts and Fallacies*. He opened his paper with this significant quotation: "'What is truth?' asked Pontius Pilate, and did not tarry for an answer." He closed it convinced that not only was the then existing knowledge of poliomyelitis insufficient to permit a statement as to mode of transmission but so meager as to demand continuing exhaustive and intensive research. More recently the same author reviews poliomyelitis in *Texas Reports on Biology and Medicine* and again cautions against authoritarian opinions and deprecates premature conclusions. The articles in question are well worth study and the subject demands serious thought.

Since Lumsden's frank avowal of the limitations of knowledge as to poliomyelitis, no inconsiderable amount of research has been carried on, particularly in relation to the means of transmission of the disease. Reports of the presence of the virus in stools, in sewage, in flies, in a mouse, have stimulated further investigations and speculations; and more and more there is questioning of the correctness of statements as to *Source of Infection* and *Mode of Transmission* of poliomyelitis as set forth in the American Public Health Association's *Control of Communicable Diseases*. Officially, as it were, the source of infection is essentially the nose and throat discharges of infected persons and carriers, "or articles recently soiled therewith"; and as to mode of transmission, it is laid down that "the virus enters the brain by way of the olfactory nerves and bulb when introduced into the nose or nasopharynx of a susceptible person, presumably from a carrier in most instances."

Thus today, with a poliomyelitis season just ending (we hope), the epidemiologist is not much further along than he was two decades ago. Actually, but scant new epidemiological knowledge has been forthcoming. The presence of virus in flies is not truly new, for Rosenau and Brues, and Frost and Anderson more than twenty years ago reported the development of what they believed to be poliomyelitis in monkeys bitten by stable flies. As regards the presence of poliomyelitis virus in human excreta, Kling, *et al.*, in 1912, and Wilbur A. Sawyer, in 1915, reported this. Jungeblut's paper which appeared in the February, 1943, issue of the JOURNAL reported recovery of poliomyelitis virus from a mouse found dead in a home where there had just been a fatal case of poliomyelitis. This is a new note in the search for knowledge but its epidemiological significance cannot be completely interpreted at this time.

Viewed historically, one sees in the present epidemiological gropings in poliomyelitis many characters and gestures similar to those that have occurred in the past, particularly in relation to the yellow fever situation toward the end of the last century. One sees a general tendency to hang on to the respectable-with-age concept of person-to-person transmission, and also there are some non-contagionists. There are found, too, the typical authoritarians who tend to lay down the law with one hand and excommunicate non-believers with the other, and there are the rebels who invite this wrath. One finds in addition the full gamut of old arguments with insistent emphasis on one special feature or another: On constitution and diatheses, on lines of population movement, on the significance of geographic distribution, and the implications of season, temperature, humidity; upon the meaning of attack rates by age, by sex, by race, and rural and urban;

on water, milk, human excreta, beasts and birds and insects. Is there somewhere a Carlos Finlay waiting for a Walter Reed, or a pump-handle waiting for a modern John Snow?

All in all, the situation strongly suggests a leanness of interpretable facts and a fatness of hard-headed opinions. In such circumstances only the open-minded may claim epidemiologic respectability and they, unlike Pontius Pilate, must tarry for an answer: unashamed to admit ignorance, unawed by authoritarian edicts, persistent and diligent in the search for truth.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

A Manual of Pulmonary Tuberculosis and an Atlas of Thoracic Roentgenology—By *David O. N. Lindberg, M.D., F.A.C.P.* Baltimore: Thomas, 1943. 219 pp. 189 ill. 145 plates. Price, \$6.50.

In this small volume the author has faithfully followed his avowed purpose of presenting "the subject of pulmonary tuberculosis with brevity and sequence, maintaining a closeness to experience in diagnosis, treatment and prevention." The introduction concisely depicts the historical background and enumerates the scientific discoveries and the fundamental methods which favor accurate diagnosis, successful management, and ultimate control.

Part one is devoted to a brief discussion of the essential factors having to do with diagnosis, treatment, and control. This section of the book contains 67 pages and is divided into 5 chapters. These chapters are accompanied by 44 illustrations, including valuable charts and tables. It is surprising how much of the available knowledge concerning the diagnosis and treatment of pulmonary tuberculosis has been crowded into the short space devoted to these subjects, yet the well informed reader may occasionally discover a certain degree of inadequacy because of the enforced brevity. This is particularly true of the chapter on diagnosis.

Roentgenologic technic and interpretation are well presented and in language which may be understood by the reader who is not expert in this field. The chapters on treatment are excellent. They deal briefly but comprehensively with the time tried principles of management, plus the varied methods

of collapse therapy. Finally, the brief chapter on control is logical, sound, and impressive.

Part two contains an Atlas made up of 145 reproductions of well chosen roentgenograms showing pulmonary tuberculosis in its various forms and many non-tuberculous pulmonary conditions. Each illustration is accompanied by a descriptive legend which is distinctly informative and authoritative, thus affording effective data for differential diagnosis. This Atlas alone constitutes a valuable contribution to our knowledge of pulmonary pathology.

The condensed information contained in this small manual should be made available to every medical student and every practising physician.

LEWIS J. MOORMAN

The Kenny Concept of Infantile Paralysis and Its Treatment—By *John A. Pohl, M.D., in collaboration with Sister Elizabeth Kenny.* With a foreword by *Frank R. Ober, M.D.* Minneapolis: Bruce Publishing Co., 1943. 368 pp. 114 ill. Price, \$5.00.

This book offers for the first time a comprehensive description of the conception and physical treatment of infantile paralysis as evolved by Sister Kenny and her American coworkers.

The main theme of the volume is presented in three parts: the acute stage, the convalescent stage, and the chronic stage. The first chapter in Part I deals with the symptoms of the acute stage under the Kenny concept: muscle spasm, mental alienation (more understandably described as nerve-muscle dissociation); incoördination of muscle action, and muscle weakness and paralysis. The other chapters in this

part include: clinical condition, nursing care, treatment of muscle spasm (preparation and application of hot fomentations), the respiratory system, and muscle stimulation.

The chapters in Part II are: the neuromuscular system (introduction to reëducation), muscle function, classification, type, action and synchronization of muscles, principles of treatment, practical considerations in the restoration of function in all parts of the body, balneotherapy, and the treated patient.

The very brief Part III deals with the rôle of orthopedic surgery and artificial supports in the chronic stage. A commentary by Dr. Miland E. Knapp, Professor of Physical Therapy at the University of Minnesota, concludes the volume. Everybody agrees that Miss Kenny deserves great credit for her original ideas in the conception and treatment of the acute stage of infantile paralysis. These ideas only evolved gradually, as shown by the fact that in her first book, published in Australia in 1937, nothing is said about muscle spasm or hot fomentations. The chief progress in this volume over those previously published is the absence of the large amount of controversy and argumentation which marred Miss Kenny's earlier writings, also the evident endeavor to present controversial issues and points of technic with clarity. Many illustrations add to the practical value of this timely volume which will be studied with equal advantage by physicians and physical therapy technicians, as by all those interested in the care of the victims of infantile paralysis.

RICHARD KOVÁCS

Review of Ethics for Nurses—
By Charlotte A. Aikens. (5th ed.)
Philadelphia: Saunders, 1943. 378 pp.
Price, \$2.50.

This readable 5th edition has as its

chief purpose the aiding of "teachers and students in the study of conduct and duty" as they relate "to nursing and nursing life." The text is designed primarily for the entering student. It aims to stress the importance of careful study of ethical principles and of the "drilling and disciplining of the woman inside the nurse." It emphasizes character as the *sine qua non* of a nurse. It presents in detail myriad carefully selected problems—situations which have troubled students. Frequently the author indicates solutions to these problems. Frequently, also, unanswered questions are designed to stimulate the student's consideration of all sides of problems.

The book consists of three units: (1) Orientation, Some Guiding Principles, which should help to orient the entering student to nursing, (2) Problems of Personal and Professional Conduct, with which the student may have to cope, and (3) Professional Obligations and Adjustments, which may face the graduate nurse.

In addition, questions for discussion or review follow each chapter. Several new chapters have been added, including the opening one on the basic principles of ethics. Many chapters have been expanded or rewritten, while new emphasis has been given the entire book. Suggestions to instructors on methods of teaching and the general handling of the course have been added in an appendix.

Questions which might be raised are:

1. Does the detailed presentation of the many problems help the student most effectively to develop a desirable "pattern for living" or should more emphasis be placed upon the development by the student of a philosophy within which her thought and conduct may be based primarily upon principles?

2. Should material be included which is studied in detail in other courses, as, for example, that in the chapter on "The Evolution of Nursing"?

3. Are the entering students able to ap-

preciate unit 3 which deals with graduate nurse obligations?

4. Would more specific sources of references add to the book's value?

5. Would "school of nursing" be preferred to "training school"?

One cannot read this text without deep appreciation of the author's fine sincerity and broad experience.

KATHARINE J. DENSFORD

Food for People—By Margaret G. Reid. New York: Wiley, 1943. 653 pp. Price, \$4.00.

Food for People opens with a consideration of food in the national economy and provides a clear picture of the present food situation in this country. It discusses food production, processing and preparation, with special reference to changes in methods and their bearing on nutrition and social control. In addition, food consumption, its status and factors affecting it, such as food preferences, food habits, nutrition education, food prices and advertising, are discussed at length.

Here is a well documented, concise, though broad in scope, contribution. It combines the subjects of economics and nutrition so that the movement of foods from production to consumption is discussed in relation to nutritional standards.

The author attempts to measure food consumption in terms of social welfare rather than in statistical trends and dollars and cents value.

However, there are those who will not agree with the sections relating to legislative and social policies. For instance, those who are cognizant of the practical problems underlying subsidies will not share Miss Reid's enthusiasm for this method of solving production and consumption problems. There are many of the measures which she presents that are still new enough and disputed enough to have statements partisan to both sides. There are

some measures that have already been shown to be impractical. Even though the author has presented an interesting treatment of these matters, she interprets many of them in the light of personal beliefs and prejudices.

This is an example of how quickly a book can become out-of-date. Many government offices mentioned, such as the Office of Defense Health and Welfare Services, Civilian Conservation Corps, Works Progress Administration, and Surplus Marketing Administration, are no longer in existence. To ration or not to ration is no longer a question but an actuality.

All told, this book is an authoritative contribution to a growing body of literature on food trends as related to national nutritional adequacy.

MARIETTA EICHELBERGER

Kaiser Wakes the Doctors—By Paul de Kruif, Ph.D. New York: Harcourt, Brace, 1943. 158 pp. Price, \$2.00.

Kaiser wakes the doctors in the best de Kruifian manner. The author is the alarm clock. Some will find his tone raucous, others a clarion call, for in this volume de Kruif employs that flair for writing and those journalistic technics by which in the past he has simultaneously aroused public interest and lifted scientific eyebrows.

Essentially, this volume tells the story of Mr. Kaiser's determination to provide good medical care for his employees. The fact that such care produces more efficient workmen is only incidental in this great builder's vision. He has a deep and abiding conviction that ordinary human beings should not be excluded from the best medical care merely because they have not sufficient funds to pay what such care costs under the present system of medical practice. Dr. Garfield is his medical director and he, on the basis of previous experiences, builds up a voluntary prepaid insurance

scheme whereby Mr. Kaiser's employees are provided a high grade medical service on the group practice basis. The fifty cents a week from each workman plus fees from compensation cases provide income sufficient, in an amazingly short time, to pay for laboratory work, x-rays, specialists, medical care, equipment, clinics, hospitals, and everything else.

The book is easy to read; and one is so strongly caught in the surging tide of great accomplishments that, for the time being at least, he tends to cheer Mr. Kaiser and his medical director and their shining goal just as he would cheer for Galahad and the Holy Grail, or for Horatio Alger, Jr. The author creates this state of mind in his readers by dramatizing ordinarily humdrum situations, by creating hero rôles for his characters, and, to no small extent, by his own Gargantuan enthusiasm. In the course of his narrative de Kruif attempts both to show and show up what he considers to be the invisible and deterring hand of a medical hierarchy, balances democratic though fumbling freedom to choose one's physician against impersonal but effective medical teamwork and finds the former wanting, indicates disapproval of government managed medical care and hopes for an extension of the Kaiser medical service system throughout industry, into rural areas, and for the country as a whole. There is a final recommendation that there be created a government Medical Loan Agency which would guarantee to "local bankers 50 per cent of any losses which might come as a result of the banks' willingness to finance these new Mayo Clinics for the common man."

Those engaged in public health work ought to read this story. Although in hyperbole, it recounts a fine undertaking from which much that is sound may be learned. Probably the book will be received enthusiastically and un-

critically by the reading public; certainly it will be gagged on as a bitter dose by those who believe that satisfactory medical care must be divided into as many administrative units as there are physicians practising.

H. S. MUSTARD

Whooping Cough—By *Joseph H. Lapin*. Springfield, Ill.: Thomas, 1943. 273 pp. Price, \$4.50.

The growing number of reports on whooping cough contain so many conflicting views and observations that a thorough survey and appraisal of the literature by one experienced in this field is needed. Dr. Lapin essays this formidable task in a book covering clinical, laboratory, public health and experimental aspects of this disease. The bibliography is desirably comprehensive but in the opinion of the reviewer the author has erred in attempting to mention in some detail in the text nearly all of the articles he has read.

An impression of insufficient exercise of critical appraisal is conveyed by devotion of space to publications amounting only to expression of unsupported opinion or inadequately controlled observations. In commenting on Table 21, age selection is noted as a factor depreciating the apparent superiority of convalescent to hyperimmune serum, but lack of statistical significance is overlooked. The physician or health officer will not find the difficult task of selecting a potent vaccine made easier by the author's broad conclusion that the efficacy of pertussis vaccines, washed or unwashed, with or without the toxic factor, is now proved quite adequately.

Dr. Lapin recommends exclusion of contacts from school for at least two weeks from last exposure, unless examined daily by a physician and cough plates taken. In support of this recommendation he argues that due to fail-

ure to exclude contacts from school, New York City has the highest case fatality rate among 13 cities over 500,000 population, although the source article makes it clear that the high rate is due to poor case reporting and New York's mortality rate ranks fourth lowest. Quarantine of cases, with placard, for 4 weeks, except where the physician may choose to allow the patient abroad with an armband, seems neither practicable nor justifiable.

This book should serve best as a convenient means of locating literature on the subject of whooping cough.

P. A. LEMBCKE

Health of Our Nation Series—By Brownell and Williams. New York: American Book Company, 1943.

1. Well and Happy. 156 pp. \$.76.
 2. Clean and Strong. 180 pp. \$.80.
 3. Fit and Ready. 243 pp. \$.84.
 4. Safe and Sound. 279 pp. \$.88.
 5. Hale and Hearty. 303 pp. \$.92.
 6. Active and Alert. 311 pp. \$.96.
 7. Living and Doing. 346 pp. \$1.00.
 8. Adventures in Growing Up—Brownell, Williams, Conrad, Evans, Kaplan, Pinckney and Ruef. 488 pp. \$1.60.
 9. Health Problems—How to Solve Them—Brownell, Williams and Hughes. 317 pp. \$1.52.
 10. Being Alive—Human Structure and Functions—Brownell, Williams, Hughes. 430 pp. \$1.60.
- Youth Faces Maturity. 30 pp. \$.20.

The Health of Our Nation Series consists of 10 volumes—7 for use as textbooks in 7 grades of elementary school, and 3 on a more advanced level.

The subject matter of these books presents comprehensively all phases of the health, growth, and personality of the child. A survey of the tables of contents reveals chapters on cleanliness, nutrition, safety, medical services, physical training, prevention of dis-

eases, and personality development. It is evident that the authors assume a knowledge of health, preventive medicine, and physiology among teachers that is rare.

The books show evidence of thorough planning. They are well graded in difficulty. The early books are planned to serve as readers. Beginning with the 4th book, a transition toward the textbook rather than the story book approach is evident. Each book expands the subjects of previous volumes and then includes one or two new topics. The authors effectively apply their own concept—that is, that growth includes a gradual expansion of control over self and environment. The volume *Being Alive* does not fit into the pattern with the other books. It is a textbook of anatomy and physiology and must be considered separately. In our opinion, the presentation of such technical subject matter requires further elaboration for the average high school student.

The series shows little recognition of organized public health as a means of protecting the community against disease. The milk inspector works for some mysterious unnamed agency. The health officer is a man who comes out of nowhere to tack up a quarantine placard. The public health physician is not mentioned.

An undue emphasis on physical training as a means of obtaining good health permeates the entire series. Fresh air, exercise, games, competitive sports, and good posture are offered as panaceas. There are several medical inaccuracies, and the books present concepts no longer generally accepted by the medical profession. For instance, the procedure of active and passive immunization against scarlet fever, as suggested by the books, is no longer considered good medical practice.

Despite these rather trivial objec-

tions, the *Health of Our Nation Series* is a splendid contribution to the teaching of health. The authors effectively motivate healthful living, giving the child concrete aims and objectives.

ELEANOR SACHS and
BENJAMIN SACHS

Memoir of Walter Reed—By Albert E. Truby, Brig. Gen. U. S. Army Ret. New York: Hoeber, 1943. 239 pp. Price, \$3.50.

It is indeed fortunate that this work has appeared before the firsthand information it contains has become unavailable. Few are still living who know intimately the details of this phase of the life of Walter Reed, and none knew this time and work better than Truby. He has been assisted by several others who were also present at the time. The result is a most interesting and valuable picture of the events that led up to one of the greatest medical discoveries of all time, i.e., the method of the spread of yellow fever, and the almost complete control of the disease that has resulted from this discovery.

As this reviewer sees it, Truby has cleared up a number of interesting details that heretofore were not clear. Many points were lacking in the account about which many of us have wondered. And although both Reed and Carroll were the reviewer's teachers at the Army Medical School some three years before the events mentioned and, though he followed their work at the time, and read everything available since, it took this book to reveal to him what was lacking. It is probable that many others therefore, will likewise appreciate this very interesting account by one who was actually present and intimately concerned with these events.

The book is clearly and interestingly written, gives an excellent picture of the time and place, and is practically

free from typographical errors. The type is easy on the eyes and the illustrations and drawings are very satisfactory. It should be available in every library, certainly every medical library. It has definite historic value.

COL. GEORGE A. SKINNER

Edelmann's Textbook of Meat Hygiene—By J. R. Mohler and A. Eichhorn. (8th ed.) Philadelphia: Lea & Febiger, 1943. 468 pp. Price, \$5.50.

The story of federal meat inspection is that of a national agency taking over a limited portion of the field of meat control, carrying on a technically excellent job but in almost complete isolation from other federal, state, or local agencies in the related public health and food control fields. As a mark of the thoroughness of this isolation, the book before us, largely the work of the two leading officials in the federal meat inspection bureau, makes no single reference whatsoever to the existence of state or local meat inspections, nor gives any recognition to the fact that 35 per cent of the beef cattle, 40 per cent of the calves and hogs, and 20 per cent of sheep and lambs slaughtered for food in this country do not receive federal inspection.

This may also have led to the self confident attitude as shown by the following paragraph in the author's preface to this eighth edition of the book (page 3):

Through the splendid organization of Federal Meat Inspection in the United States, the incidence of harmful results from consumption of meat and meat food products has been reduced to a minimum and it behooves those in charge of this important hygienic procedure to continue the excellent work which has been recognized as a model for guarding the public health from disease resulting from the ingestion of contaminated meats and meat food products. The limited number of such cases which have been traced to meats and meat food products could invariably be attributed to exposures after

the products have left the custody of the controlled establishments and therefore must be considered the result of careless handling in the subsequent processing, storing, and culinary preparation.

This would seem to ignore too readily the frequent and increasing number of food poisoning outbreaks, largely staphylococcus poisonings, in which meat (cured hams, tongues, etc.) has been involved. Nowhere in the volume have I found mention of any inadequacy in the Federal Meat Inspection Service.

From a public health standpoint, the volume fails to present a full picture of the highly important trichinosis problem. Not one word is given of the extensive studies on trichinosis by Dr. Maurice C. Hall and his coworkers of the U. S. Public Health Service. The most recent data on occurrences of trichinosis given in the book go back to 1913. Again the authors would lead you to assume that, at least as to federally inspected meat, there is no trichinosis hazard, for example, their comments on (page 283): "Instructions have been issued in connection with Federal meat inspection for the purpose of avoiding any possible danger from the ingestion of trichinous meat." This statement fails to make clear that these instructions, which are requirements for treatment (curing, refrigeration, heating) apply only to pork products *classed as commonly eaten raw*—hams, pork butts, sausages, and that pork and pork products not recognized as commonly eaten raw may be trichinous, and known to be such, yet will be stamped as inspected and passed. That little or no reliance can be placed on the warning that thorough cooking of pork must be carried out at the time of preparation, is too well shown by the numbers of trichinosis infections now being encountered.

These few critical observations on this Eighth Edition of *Textbook of*

Meat Hygiene by Edelmann, Mohler, and Eichhorn are not in any way to be taken as an indication that an unsatisfactory treatise on the subject has been presented—quite the other way. This book is a finely done and outstanding work and has long been given a most authoritative position in its field. The book contains well written and illustrated chapters on Morphology and Chemistry of Tissues and Organs of Food Animals, on Diseases of Food Producing Animals. It is especially thorough and complete in presenting the history, procedures, practices, regulations of the Federal Meat Inspection Service. Full illustrated descriptions are given of the operations carried on in abattoirs and meat processing plants under the federal control. I can think of no veterinarian or other worker active in meat inspection who would not need to have this volume within his ready reach.

SOL PINCUS

Do You Want to Be a Nurse?—
By Dorothy Sutherland. Garden City: Doubleday, Doran, 1942. 186 pp. Price, \$2.00.

For girls in high school and college who wish for more details about nursing as a career than they can read in the free pamphlets available from the Nursing Information Bureau (1790 Broadway, New York, N. Y.), Miss Sutherland's small book *Do You Want to Be a Nurse?* is an informative guide. Unfortunately, nursing in wartime is subject to change overnight and already some of the statements in this book need modification. The author gives in full, however, the names and addresses of agencies where up-to-the-minute vocational guidance can be obtained.

One might gain the impression after reading Miss Sutherland's description of what it takes to make a successful nurse, that only super-women need apply. Such an approach may be discouraging to the average young woman

who cannot realize that she may develop the essential qualities only after three years of experience in caring for the sick. On the whole, however, the profession is presented attractively and fairly and the thumbnail sketches of actual work now being performed by nurses will open wider horizons to prospective nurses than they have probably envisioned in the past.

DOROTHY DEMING

The Conquest of Epidemic Disease—By *Charles-Edward Amory Winslow*. Princeton: Princeton University Press, 1943. 411 pp. Price, \$4.50.

This book is more than a compendium of data and references from the Old Testament theory of pestilence as a punishment for sin, through the days of demons, miasms, and germs, down to the streamlined concepts of the virus diseases and the new views concerning aerial dissemination of infection. It is an interesting and highly instructive story, rich with the author's interpretations of the values of each stage of the historical development of knowledge regarding the modes and channels of disease spread.

From a consideration of Hippocratic thought with its visualization of a universe of natural law, but without significant reference to disease communicability, the reader progresses to the primitive concepts of contagion. The recognition of the relation of human plague to diseases of rodents soon suggested an implication of contagion. Galen had recognized that rabies is caused by the bite of a mad dog and Bernard Gordon in the 13th century had contributed his famous list of the eight diseases which were contagious, but it remained for the Black Death, which became pandemic in the middle of the 14th century, to teach beyond any peradventure the communicability of disease.

The chapter on Fracastorius illustrates the instructive way in which the author has discussed the then prevailing views of the causes of disease and proceeds to a critical analysis of a new contribution. The essay on *Contagion* is outlined by chapters with a generous seasoning of comment which makes the book invaluable to the student of public health. In fact, not only the epidemiologist and public health administrator but every practitioner of preventive medicine will enjoy and derive great value from a reading of this book.

It was Fracastorius in the early 16th century who presented the fundamental classification of three different types of contagion—those which infect by direct contact only, those which may also spread by fomes, and those which may infect at a distance. Paying tribute to Sydenham as a great clinician, the English Hippocrates, the author states that "his almost complete neglect of contagion as a practical factor in the spread of epidemic disease and his major stress upon the metaphysical factor of epidemic constitution held back epidemiological progress for two hundred years."

The story of yellow fever in our colonial days is interestingly told by the work of Benjamin Rush and Noah Webster who still adhered to the doctrine that one disease could be transformed into another. "The nineteenth century Filth Theory of Disease was a relatively precise and scientific form of the old doctrine of miasms. It was backed up by statistical and epidemiological evidence; and it actually accomplished results in the practical control of epidemic disease."

The strength of the miasmatic theory was overthrown before the days of Pasteur by the three pioneer epidemiologists, Panum, Budd, and Snow. Their studies on measles, typhoid fever, and cholera are well known to every

student, but Winslow takes the reader in behind the scenes and shows how these healthmen demonstrated the basic facts with regard to the spread of these diseases.

There is a fine chapter on Pasteur, with proportionate credit to Plenciz, Henle, Lister, and Koch for the contributions that these men and their associates made to the newer knowledge. In discussing the importance of the human carrier to disease dissemination, the work of Koch with cholera is recognized; Park and Beebe with diphtheria; Reed, Vaughan, and Shakespeare with typhoid; and later work of other pioneers with meningitis and poliomyelitis. To Theobald Smith goes major credit for solving the puzzling problem of the insect host. The work of Manson with filariasis, Bruce with the tsetse-fly, Ross and Laveran with malaria, Reed and his associates with yellow fever, the English Plague Commission, is not overlooked. Quite appropriately the book closes with a recital of the contributions of Chapin, that dean of American public health administrators, who had the courage to practise the principles established by the research investigator and laboratory worker.

In the words of the author "we are too prone to honor (or dishonor) the great men of the past without ever reading them to see what they really said." Here is our opportunity to know these great men through the laborious readings and studies of a great teacher, an epidemiologist, laboratorian, and health educator, a leader among the healthmen of our age. HENRY F. VAUGHAN

Communicable Diseases for Nurses—By Bower and Pilant. (5th ed.) New York: Saunders, 1943. 562 pp. Price, \$3.00.

The list of infectious diseases treated in this fifth edition is exhaustive. Practical, specific suggestions are given for

the nursing care of each disease and the relation of good nursing to the prevention of complications is consistently stressed. The excellent colored photographs which illustrate the various eruptions and changes in throat conditions are invaluable teaching aids since it is seldom possible for a student nurse to be in the communicable disease department in more than one season.

The description of medical aseptic technic is clear, well illustrated, and contains many practical suggestions, but may leave the reader with the impression that there is only one *right* way to set up an isolation technic. If student nurses are going to be able, as graduates, to direct the care of communicable diseases in homes, on open wards, in clinics or wherever adaptations are needed, their thinking must be directed toward the *principles* upon which such technics are based. The chapter on the care of communicable disease in the home would be more valuable if the emphasis were placed upon the nursing care of the patient and the instructions to be given the mother in that regard rather than upon the fine details of technic. Too often the nurse tries to impose a rigid technic designed for the hospital with its clearly differentiated "clean" and "contaminated" areas, and forgets that the patients' completed restoration to health is the most important thing.

Many supervisors of communicable disease departments will disagree with the suggestion found on page 46 that it is necessary, even desirable, to have a "treatment nurse" pour the medicines and prepare the hypodermics for the nurse in the unit to administer.

This edition introduces a set of questions at the close of each chapter. They are quite elementary, sometimes self-evident, and can be answered by direct quotation from the facts stated in the chapter. They would be much more valuable if they were "problem"

questions, the solution of which depended upon the student's ability to understand and apply the facts presented.

The book provides excellent reference material and is recommended for every communicable disease library.

IDA MACDONALD

Behind the Sulfa Drugs. *A Short History of Chemotherapy*—By Iago Galdston, M.D. New York: Appleton-Century, 1943. 174 pp. Price, \$2.00.

This book is more accurately described by the subtitle than by the title, for it summarizes the course of events in the entire field of chemotherapy. It is extraordinarily interesting.

One's attention is caught on the first page by a discussion of the precise meaning of the word "Chemotherapy" and of what distinguishes it from the older "Iatrochemistry." There follow brief but vivid sketches of Paracelsus and Boyle, of the pioneers in the coal industry and William Henry (Mauve) Perkin. Pasteur and Koch are introduced for the part they played in defining the objective. But the main body of the book is devoted to an analysis of the achievements of Paul Ehrlich. The account is necessarily abridged, yet the image it presents of the many facets of this brilliant mind is three dimensional for all its compactness. In the last two and one-half chapters the story of the sulfonamides themselves is dealt with—somewhat sketchily, considering the title.

Two errors call for comment. Poliomyelitis and influenza are spoken of as bacterial diseases and sulfanilamide is twice described as a dye. The latter mistake is annoying to the present reviewer who believes that it was because sulfanilamide is *not* a dye that it lay unrecognized for twenty-five years. But these lapses, while irritating to the specialist, will do the general public no harm, nor do they detract from the interest which the book as a whole will

have for the scientist who wants to know how chemotherapy came about.

ELEANOR A. BLISS

Chemical-Technical Dictionary—By A. W. Mayer. (*German-English-French-Russian.*) (1st American ed.) Translation under the direction of Prof. B. N. Menshutkin and Prof. M. A. Bloch. Brooklyn: Chemical Publishing Co., 1942. 872 pp. Price, \$8.00.

The reviewer is at a loss to see the need for the publication here of a four-language dictionary with English instead of American spelling, particularly in view of the existing excellent six-language dictionaries available.

The paper used is very poor for a book intended for continuous and hard use; the printing is even poorer, having obviously been done from old type or plates. There are many broken letters which cannot be read, even with a magnifying glass.

Twenty-five German words, strictly of chemical import were taken at random from two other German-English dictionaries. Of these seven were absent from this alleged new work which shows internal evidence of a hastily-done, old job. Biochemical terms are conspicuously absent. The purchase of this book cannot be recommended.

D. D. BEROLZHEIMER

Health and Physical Fitness—By I. H. Goldberger and Grace T. Hallock. New York: Ginn, 1943. 596 pp. Price, \$1.92.

Health and Physical Fitness is a lively new, highly interesting book.

To one grown up in health education, it is most refreshing, expressing many of the basic technics advocated by qualified workers in this field.

The book was written for today with wartime emphasis throughout. The following examples will indicate that the subject material is recent: The High School Victory Corps Physical Fitness

Program, food rationing and food requirements, absenteeism in industry, use of blood plasma, nursery school care of children of working mothers, civilian defense and Red Cross activities, chemical warfare, communicable disease control, mental health and war fears, tuberculosis control, a balanced program of work, exercise, recreation, rest and sleep during wartime.

A great wealth of health education material is packed into one small volume, arranged in easy reading style, that should be a delight to the busy reader.

For more serious use the book is especially adapted for classroom teaching of high school pupils and youth groups. It answers many of the health and personal hygiene questions of youth. It is arranged in units of instruction with attractive captions and at the end of each unit there are stimulating questions—methods of testing one's health knowledge, and suggestions for further research.

At this time the book can be especially useful in the High School Victory Corps Physical Fitness Program. The volume provides in sound scientific and interesting fashion much of the health education material one would like to crowd into the last opportunity of instructing boys and girls who are leaving schools and are going into war service or to jobs in essential industries.

The book is illustrated throughout with numerous excellent photographs suited to the subject matter and having just the proper psychological effect. There are also many unique diagrams not seen by the reviewer in any previous books.

CARL A. WILZBACH

Oral Tests in Public Personnel Selection—A Report Submitted to the Civil Service Assembly—By the Committee on Oral Tests in Public Personnel Selection, Samuel H. Ord-

way, Jr., Chairman. Chicago: Civil Service Assembly of the United States and Canada, 1943. 174 pp.

The oral test as a means of arriving at a competitive evaluation of the "personal traits, characteristics, capacities, and behavior patterns that are believed to indicate the probability of success on the job" has probably come to be considered the most indispensable tool of public personnel selection. As such, it cannot be too often or too intensively scrutinized and appraised. The Civil Service Assembly in the most recent of a series of reports dealing with public personnel administration has done a thoroughly conscientious job of underlining the shortcomings inherent in an unintelligent application of the technic, and has presented an instructive analysis of the steps which must be taken to transform what has often been an arbitrary, inequitable, and inefficient measure into what can be a controlled, legally defensible, and fruitful procedure.

LILLIAN DICK LONG

The Examination of Waters and Water Supplies—By E. V. Suckling. (5th ed.) Philadelphia: Blakiston, 1943. 849 pp. Price, \$12.00.

This volume is the fifth edition of the best known compendium on water examination. The author has accomplished a difficult job in a manner which does credit to his distinguished predecessors, Dr. Thresh and Dr. Beale. This book is far more than its title indicates. It is a discussion of the chemical and biologic ingredients of waters from many sources, the interpretation and the methods of chemical and biologic analyses and their limitations. The emphasis is on analyses for sanitary purposes.

Methods for chemical analysis correspond closely to those in use in this country. As described they can be used only by a trained chemist. This

is entirely to the credit of the author. Too many American laboratory manuals are written with the hope that the office boy can replace the graduate chemist. The determination of free chlorine is described too briefly in view of the difficulties involved.

Bacteriologic methods differ from those in use in this country mainly because MacConkey lactose broth and agar are still the preferred media in English laboratories. Much valuable data on the differentiation of coliform bacteria are included. The author recommends "Bact. coli" as the best indicator of fecal pollution. For practical tests, the appearance of characteristic colonies on MacConkey agar after gas formation in lactose broth, is regarded as sufficient, but further differential tests are strongly

urged. The presence or absence of fecal types of coliform organisms in 100 cc. of water is the criterion of choice, with the usual reservations concerning the significance of the other coliform bacteria.

A considerable section is devoted to the purification of water in all its phases. An interesting section gives detailed mineral analyses of waters from various geologic sources.

There is evident confusion between the laboratory guide *Standard Methods for the Examination of Water and Sewage*, published by the A.P.H.A. and the A.W.W.A., and the U. S. Public Health Service standards of purity for common carriers but such confusion exists also in this country.

JOHN F. NORTON

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Boom in Baby Business—Just what the anticipated 1943 birth rate of 24 per 1,000 will mean in terms of limited medical and nursing services is dramatized in a graph showing the cumulation of gains in births during the last decade.

ANON. A Dividend of Two Million Babies in Ten Years. *Stat. Bull. (Met. Life Ins. Co.)*. 24, 8:4 (Aug.), 1943.

108,000 M.D.'s : 120.8 Millions :: 1:1,118.5—From the O.W.I. comes this comprehensive report on health and doctor shortage, the data originating in the Public Health Service, War Manpower Commission, and the Federal Works Agency.

ANON. Doctor Shortage and Civilian Health in Wartime. *J.A.M.A.* 123, 4:214 (Sept. 25), 1943.

Health Barometer of Germany's Large Cities B. B. (Before Bombing)—Infant death rate increased to 66 in 1942, and deaths of children under 5 rose sharply, but adolescents' rates rose more sharply than any other group. Tuberculosis death rates in 1942 were 24 per cent higher than in 1939. Suicides, too, have increased during the war years. Birth rate—12.7—is down from 17.3 in 1940.

ANON. The Death Rate in Germany. *Science*. 98, 2536:126 (Aug. 6), 1943.

Babies' Sore Eyes Are Cured—Items on medical treatment are not supposed to be included in these annotations, but this one seems to be of sufficient interest to public health to warrant mention here. Infants with gonorrheal ophthalmia treated with sulfonamide drugs by mouth were cured quickly, without complications.

BLUMBERG, M. L., and GLEICH, M. The Simplified Treatment of Gonococcal Ophthalmia Neonatorum With Chemotherapy. *J.A.M.A.* 123, 3:132 (Sept. 18), 1943.

Physical Wrecks, Unlimited—If this sampling is at all typical of our young American men, then the state of their physical incompetence is nothing short of appalling, and health and physical educational programs stand convicted of their inadequacy.

CURETON, T. K. The Unfitness of Young Men in Motor Fitness. *J.A.M.A.* 123, 2:70 (Sept. 11), 1943.

Some Good from Very Ill Wind—By the end of this year 25,000 asymptomatic persons will have been discovered and diagnosed as needing hospitalization for tuberculosis. That can be put to the credit of the war which, Heaven knows, has plenty on the debit side of the balance sheet.

DEMPSEY, M. New Cases of Tuberculosis Discovered by Case-Finding Surveys. *Am. Rev. Tuberc.* 48, 1:58 (July), 1943.

Why Does Cancer of the Lungs Increase?—Rapid increases in the death rate of cancer of the respiratory system are in striking contrast to the slowing change in death rates for all forms of cancer. The author explores the possibility of atmospheric pollution as a precipitating cause and can discover no affirmative evidence. He assumes that the causes are too complicated to be discovered by the relatively crude statistical sources now available.

DORN, H. F. The Incidence and Prevalence of Cancer of the Lung. *Pub. Health Rep.* 58, 34:1265 (Aug. 20), 1943.

Preventing Radium Poisoning—If proper precautions are taken, there

need never be any more deaths or injury due to exposure to radium by dial painters and others. You will be interested in the thoroughness with which the precautionary measures must be applied even though there may be no shops utilizing radium in your own bailiwick.

EVANS, R. D., Protection of Radium Dial Workers and Radiologists from Injury by Radium (and) MORRIS, G. E., *et al.* Protection of Radium Dial Painters—Specific Work Habits and Equipment. *J. Indust. Hyg. & Toxicol.* 25, 7:253 (Sept.), 1943.

Odd Facts Department—Twenty years ago some cultures of *Bacillus pestis* were stoppered tight and put away. When subcultured this year, 2 out of each 3 were still viable. Guinea pigs inoculated with some of the cultures died of plague and the organisms were recovered from their blood.

FRANCIS, E. Twenty-Year Survival of Virulent *Bacillus Pestis* Cultures Without Transfer. *Pub. Health Rep.* 58, 37:1378 (Sept. 10), 1943.

Morbidity Rates Mount—Illness rates for employed men and women in 1942 were highest of a decade. The chief incapacitating causes among the men that year were pneumonia, bronchitis, and diarrhea and enteritis. The corresponding causes for the females were diseases of the organs of locomotion, pneumonia, and neurasthenia. Interesting graphs throw some light on these phenomena.

GAFAFER, W. M. Sickness Absenteeism among Male and Female Industrial Workers 1933–1942 Inclusive. *Pub. Health Rep.* 58, 33:1250 (Aug. 13), 1943.

“As Long as It Isn’t a Pill”—American diets are deficient in vitamins, and the American diet is what the war worker eats. Vitamin concentrates fed to war workers increase production, and production is the essence of our national salvation. Ergo, give workers vitamins. Even some of the cons

among the discussers admit that brewer’s yeast might properly be given—as long as it isn’t in “pill” form. As this seems to be breaking-the-rule month for this bibliography, the rule of items from scientific periodicals only is broken to point to a paper in this excellent report which should be in every public health agency’s library.

HAGGARD, H. W. Should War Workers Be Fed Vitamins? *The Nutrition Front*. Legislative Document No. 64, 1943. Report of the New York State Joint Legislative Committee on Nutrition.

Good News for Infant Pin Cushions—Alum-precipitated, combined diphtheria toxoid and pertussis vaccine protected children against both diseases and spared the youngsters some unwelcome injections.

KENDRICK, P. L. A Field Study of Alum-Precipitated Combined Pertussis Vaccine and Diphtheria Toxoid for Active Immunization. *Am. J. Hyg.* 38, 2:193 (Sept.), 1943.

Our Ill-Favored Youth—Among 45,000 draft registrants 18 and 19 years old, 253 per 1,000 were rejected. The table of causes of rejection for white boys and negroes is disheartening but important. It should be noted that the cream of the physical crop had already enlisted or had been enrolled while in college, or had been accepted in defense jobs. Still the record is dreadful.

ROWNTREE, L. G., *et al.* Causes of Rejection and the Incidence of Defects. *J.A.M.A.* 123, 4:182 (Sept. 25), 1943.

It’s Not Just Chills’n’Fever—Recent experiences with malaria have given rise to some new concepts in the prevention and treatment of the disease which you should know about. Atypical malaria complicates the picture. In the same issue of the *Journal* is an official pronouncement on the modern treatment of malaria.

TALBOT, D. R. New Aspects of Malaria. *J.A.M.A.* 123, 4:192 (Sept. 25), 1943.

Sister Kenny Should Worry!—Kenny concepts of muscle involvement in poliomyelitis, although the basis of an excellent type of treatment, are inadequate as a physiologic explanation of the dysfunction present. Proof-of-the-pudding minded health workers will read this excellent paper with a detached open-mindedness. Of Kenny's three descriptive terms, only "incoördination" holds water: but for this the authors suggest, as a substitute, "disordered reciprocal innervation."

WATKINS, A. L., *et al.* Concepts of Muscle Dysfunction in Poliomyelitis. J.A.M.A. 123, 4:188 (Sept. 25), 1943.

A Paper You Should Read—Roughly 25 per cent of our food production will be purchased by the government, yet as much will be left for home consumption as was used before the war. Red meat—believe it or not—is almost as plentiful as for the period 1935–1939: at 124.5 pounds per capita. With better money wages consumption of the protective (and expensive) foods was greatly increased. But, even in this day, a fifth of our population does not receive income enough to purchase the kind of food needed for a good diet. Note of apology: these annotations are not intended to be in the nature of abstracts,

but I couldn't resist a few excerpts from this paper packed with useful information.

WILDER, R. M. Nutritional Requirements in Time of War. New Eng. J. Med. 229, 13:495 (Sept. 23), 1943.

Garbage-Fed Swine Stand Condemned—Among nearly 12,000 post-mortem examinations of diaphragm muscle conducted the country over, 16 per cent were positive for *Trichinella spiralis*. Data are presented in this summary which indicate that superimposed trichina infections occur, that previous infections confer no immunity, and that not all attacks are diagnosed.

WRIGHT, W. H., *et al.* Studies on Trichinosis. Pub. Health Rep. 58, 35:1293 (Aug. 27), 1943.

Toward Better Mental Health—Something about the historical and the present-day activities of the twenty year old mental health program in Massachusetts. The constantly increasing preventive services rendered by the state agency and the heightening public awareness of the need for better mental health facilities are telling straws in the wind.

YERBURY, E. C. A State Mental Hygiene Program. Mental Hygiene. 27, 3:457 (July), 1943.

ASSOCIATION NEWS

OFFICERS, 1943-1944

President, Felix J. Underwood, M.D., Jackson, Miss.

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Edward G. McGavran, M.D., Clayton, Mo. (1946)

Sedgwick Memorial Medal for 1943 Awarded to Dr. James Stevens Simmons

Brigadier General James Stevens Simmons, M.C., U. S. A., to whom the Sedgwick Memorial Medal was awarded for 1943, is Chief of the Preventive Medicine Division of the Office of the Surgeon General, U. S. Army, Washington, D. C. General Simmons was

born in North Carolina in 1890. After attending Davidson College and the University of North Carolina he received his medical degree in 1915 from the University of Pennsylvania, followed in 1934 by a Ph.D. degree at George Washington University Medical School, and by the doctorate in public health at Harvard in 1939. Davidson College awarded him an honorary doctorate in science in 1937. Dr. Simmons entered the Medical Corps in July, 1916, serving as Chief of the Laboratory Service at the Base Hospital at Fort Bliss, Tex., and Commanding Officer of the Southern Department Laboratories and Chief of Laboratory Service, Fort Sam Houston, Tex. He organized and commanded the stationary overseas laboratory No. 6 at the Yale Army Laboratory School 1918. He was in charge of laboratory work investigating meningitis carriers 1919, and in that year became Chief of Laboratory Service, Walter Reed Hospital, Washington. He later served in laboratory positions in the Hawaiian Islands and was placed in charge of



James Stevens Simmons

the Department of Bacteriology at the Army Medical, Dental and Veterinary Schools, Washington, where he served from 1924 to 1928, later becoming Director of the Department of Preventive Medicine in the Army Medical, Dental and Veterinary Schools, Washington.

General Simmons has shown special interest among other subjects, in leprosy control and in the encephalitis epidemic in St. Louis. He has been

a member of the National Malaria Committee since 1936. He served on the A.P.H.A. Committee for the Study of the Effectiveness of Typhoid Vaccination. He is a lecturer in preventive medicine at The Johns Hopkins Medical School, and is the Army member of the Division of Medical Sciences, National Research Council. His recently collected bibliography included 98 titles.

MESSAGE FROM THE BRITISH MINISTER OF HEALTH

The Right Honorable Ernest Brown, M.C., M.P., Minister of Health in Great Britain, has sent the following message to the American Public Health Association through Frank A. Calderone, M.D., the Chairman of the War Health Information Committee in connection with the 72nd Annual Meeting of the Association.

"The British Commonwealth of Nations and the United States of America are linked in a common struggle against common enemies. When the forces of evil are defeated, there will be new battles to be fought; and one will be against Disease, that eternal enemy of human happiness, security and welfare. If we are to win the peace, the Battle of Health must be waged with all available resources and on the broadest possible front. We shall still be engaged in a common struggle against common enemies; because disease knows no boundaries, and the public health problems which will follow global warfare cannot be tackled effectively unless they are approached internationally.

"Already there is a large measure of co-operation between the Allies—complete exchange of information, and pooling of resources in drugs and medical equipment, for example. We have had in Britain most valuable personal assistance from leaders of American Medical Science such as Professor

Gordon of Harvard, Professor Sydenstricker, Dr. Meiklejohn, Dr. Wilson and many others. From our side of the Atlantic Ocean, Sir Wilson Jameson, Dr. Macintosh, Professor Burn and the late Dr. Warrington York have paid visits to facilitate co-operation and to tell you all they can about our experience of public health problems under the strains of war, including heavy bombing of civilian populations. International co-operation of this kind must continue and, indeed, expand. I shall look forward to the return of Dr. Dorothy Taylor, the Senior Medical Officer for maternal and child welfare in my Ministry, and to receiving from her a first hand account of your deliberations in which she is taking part this October.

"The pioneering spirit of the Rockefeller Foundation in bringing health to the less fortunate peoples of the earth has been a pointer on the way of social betterment which the British Commonwealth is also following. Even more intensive measures are being taken in the Colonies and Dependencies to improve medical services in the widest sense. I do not need to remind this Conference of the leading place British doctors have taken in the development of the science of Tropical Diseases. A special problem of the present and the future is malaria, and I can assure you that the Governments of our two

peoples have completely interlocked their plans for dealing with this terrible menace.

"The problem of post-war relief of the peoples we shall free from Nazi tyranny are staggering in their magnitude. Already large scale plans are being made by our Governments acting in concert. I see in this a tremendous impetus to international co-operation which will not die away when the immediate crisis is past.

"On the Health Front at home, Britain has learned three big lessons. For the first time, we have a national, planned policy on nutrition; and living as we are on a narrow margin of rations, we have drawn rich dividends from it. I fully believe that after the war none of us is going to lose sight of the benefits that would come from an international view of the nutrition question.

"The second point is that popular interest in health questions—not just personal health, but public health—has increased during the war. Without the informed interest and consistent support of the mass of the people, we could not have maintained national health. There is a new interest in health as something positive, not merely freedom from disease. Health has become news, and Prevention is acquiring some of the drama of Cure.

Total war has made us realise more keenly than ever before in our history that it is upon the health of the people that all our power depends, and that better health cannot be secured without the full co-operation of the people themselves.

"The third lesson we in Britain have learned is the need to knit together and expand all the various health services. We have got more team-work in medicine; after the war we must achieve still more. His Majesty's Government has accepted the principle of a comprehensive National Health Service which will provide all forms of medical and hospital care for every man, woman and child in Britain, as a matter of citizen right.

"I am convinced that if the world is to cope effectively with the grave problems of control of disease which will arise in the post-war period, we shall need planned, *inspired* team-work in the international field, and a wide public recognition in the democratic nations of the global character of public health protection.

"Your Association has done magnificent work in the field of public health, work I may say which is continually watched and admired by the officers of my Ministry. May you long continue to carry the standard of progress!"

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Erich J. Arendt, M.D., Health Dept., Commerce St., San Antonio, Tex., Asst. Health Officer
 Frederick R. Bausch, M.D., City Hall, Allentown, Pa., Health Officer
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 Ethel Winn, Spencer Ave., Elwood, Ill., Supervising Nurse, Joliet Elementary Schools

Unaffiliated

John B. Alsever, M.D., U. S. Office of Civilian Defense, Washington, D. C., Surgeon (R), U. S. Public Health Service
 Arleen S. Barron, 818 Santa Ray Ave., Oakland, Calif., Laboratory Technician, Peralta Hospital
 Abraham O. Wilensky, M.D., 12 East 87th St., New York 28, N. Y., Practising Physician

DECEASED MEMBERS

Loneta M. Campbell, R.N., Cincinnati, Ohio, Elected Member 1934, Elected Fellow 1938, Public Health Nursing Section
 J. K. Gore, Orange, N. J., Elected Member 1921, Unaffiliated
 Ruth Ogden Pierson, East Orange, N. J., Elected Member 1917, Laboratory Section

NEWS FROM THE FIELD

PUBLIC HEALTH SERVICE ORDINANCE FOR EATING AND DRINKING ESTABLISHMENTS, 1943

The U. S. Public Health Service has published *Public Health Bulletin No. 280* (U. S. Gov. Ptg. Office, Washington, D. C., 20¢), representing the first printed edition of an ordinance and code recommended for adoption by local communities and states in order to encourage a greater uniformity and a higher level of excellence in the sanitary control of eating and drinking establishments. This edition replaces the mimeographed 1940 edition.

Among the changes made in this edition of the Ordinance and Code, there may be mentioned the inclusion of illustrations and explanatory material which has been improved and expanded; field tests have been provided for cadmium and cyanide, rebaking of cream-filled pastries or adequate boiling of the filling is required, running water under pressure is required, lavatories must be supplied with hot and cold running water, and the swab test technic given is that proposed in June, 1943, by the Subcommittee on Food Utensil Sanitation of the A.P.H.A. It is also provided that the restaurant building is required to be rat-proofed and training courses for food handlers are recommended.

VISITING PROFESSORS NAMED AT PUERTO RICO SCHOOL OF TROPICAL MEDICINE

Columbia University, New York, N. Y., recently announced the appointment of 5 visiting professors at the School of Tropical Medicine in San Juan, Puerto Rico, which is operated in connection with the University. The names of the new visiting professors are as follows: Dr. Ceil A. Watson, Dr.

Gustavo Pittaluga, Dr. Antonio Fernos-Isern, Dr. Tomas Blanco, and Dr. Joseph H. Bolton.

QUEBEC PRIESTS TO STUDY PUBLIC HEALTH AT YALE

Dr. Jules Gilbert, Director of Public Health Education, with the financial assistance of the Ministry of Health, Quebec, is collaborating with six teaching orders to send five Catholic brothers and two fathers to the Department of Public Health, Yale University School of Medicine, New Haven, for a year's training in health education and public health. On their return to Quebec they will devote themselves primarily to school health education work in the normal schools of their respective orders, in conjunction with the Ministry of Health. The group will consist of the following:

R.P. Roland Blondeau, Rosemont
R.P. Raymond Lavoie, Joliette
R.F. Berchmans-Eugène, Laprairie
R.F. Evan, Sorel
R.F. Gaston Quenneville, Outremont
R.F. Jean-Lucien, Granby
R.F. Rémi Donat, Iberville.

STAFF CHANGES, MEDICAL AND HEALTH SERVICES, AMERICAN RED CROSS

Albert McCown, M.D., Dr.P.H., has resigned as Director of Medical and Health Services of the American Red Cross to accept a commission as Lieutenant Colonel in the Medical Corps, A.U.S. and is leaving shortly for a foreign assignment with the Allied Military Governments.

G. Foard McGinness, M.D., Dr.P.H., the director of Medical and Health Services for the Midwestern Area, American Red Cross, St. Louis, has been appointed acting director of Medical and Health Services at Na-

tional Headquarters of the Red Cross, Washington.

Amos G. Christie, M.D., of Washington has resigned as assistant director of Medical and Health Services, American Red Cross, as of October 1, to become Professor of Pediatrics at Vanderbilt University School of Medicine, Nashville, Tenn., succeeding the late Horton G. Casparis, M.D.

AMERICAN STANDARDS ASSOCIATION
REVISES CODE FOR ABRASIVE
WHEELS

The American Standards Association has announced approval of an important revision of the Abrasive Wheel Safety Code, the first revision since 1935. New sections have been added to keep pace with changes in the industry. Completely new rules have been written for mounted wheels. New speed rules have been drawn up for crankshaft grinding, camshaft grinding, and thread grinding operations. While the basic speed tables remain the same, the Code has been carefully reviewed and many points have been clarified. Need for a revision of the Code became increasingly apparent during the period of expanding war industries. Several types of abrasive wheels and grinding operations which previously had very limited usage, found an important place in the new industries. The *Safety Code for the Use, Care, and Protection of Abrasive Wheels* (B7-1943) may be obtained from the American Standards Association, 29 West 39th Street, New York 18, N. Y., at 35 cents per copy.

HEALTH UNIT IN VERA CRUZ

The *Journal of the American Medical Association* reports that the Department of Health of Mexico has entered into an agreement with the School of Medicine at Tulane University, New Orleans, to establish a health unit and field training station at Boca del Rio, Vera Cruz, Mexico. The unit will

function as a health center for the welfare of the community and serve as a training center for physicians named by the Department of Health of Mexico or by the University with the approval of the Mexican Department.

SIR ARTHUR NEWSHOLME'S BEQUEST

Science reports that Sir Arthur Newsholme, who died on May 17, bequeathed the residue of his estate to the London School of Hygiene and Tropical Medicine.

REFRESHER COURSE IN TROPICAL
MEDICINE

The South Dakota State Board of Health in coöperation with the U. S. Public Health Service sponsored a series of lectures on tropical diseases to medical students in six areas of South Dakota. M. Fernan-Nunez, M.D., Professor of Pathology and Tropical Medicine, Marquette University Medical School, Milwaukee, was the speaker. Dr. Fernan-Nunez also lectured at Camp McCoy, Wisconsin, in September on Malaria.

NEW YORK STATE STAFF MEMBERS
STUDY TROPICAL DISEASES

New York State *Health News* reports that Robert F. Korns, M.D., Dr.P.H., Epidemiologist on the staff of the Division of Communicable Diseases, has been granted a leave of absence for special study and clinical observation of tropical diseases. He will spend two months in tropical medicine at the Army Medical School in Washington and then travel to Honduras and Guatemala, Central America, as a member of the faculty of Albany Medical College, under the program sponsored by the Association of American Medical Colleges.

Paul A. Lembcke, M.D., District Health Officer of the State Department of Health, has just returned from a trip to Costa Rica and Guatemala where

he was sent as a member of the staff of the University of Rochester Medical School to obtain clinical experience in the tropical diseases.

Albert H. Harris, M.D., Associate Bacteriologist in the Division of Laboratories and Research of the department attended the course in tropical and military medicine given at the Army Medical School which ended in June.

OFRRO APPOINTMENTS

The Office of Foreign Relief and Rehabilitation Operations of the U. S. Department of State has announced the appointment of Margaret G. Arnstein, R.N., recently of the New York State Department of Health, and of Therese Kerze, R.N., formerly Assistant Director of the Judson Health Center, New York, as Senior Public Health Nursing Officers in OFRRO. Both of the appointees are spending a brief period in Washington for training purposes before going overseas. The current intensive orientation and training course includes 22 persons for a period of 4 to 6 weeks.

NUTRITION FOUNDATION RESEARCH

Annually \$237,000 is now being contributed by 37 food and related manufacturers to the Nutrition Foundation in support of basic research in the science of nutrition, according to a statement made by George A. Sloan, President of the Foundation.

It was also announced that Abbotts Dairies of Philadelphia and the American Lecithin Company of New York have become Sustaining Members of the Foundation. C. R. Lindback, President of Abbotts Dairies, and Adrian D. Joyce, Chairman of the American Lecithin Company, have become members of the Board of Trustees, which consists of 11 representatives from the public and 33 from industry.

Mr. Sloan stated that the Nutrition

Foundation is now supporting 70 basic studies in 38 institutions in the United States and Canada. On the recommendation of the Scientific Advisory Committee of the Foundation, grants-in-aid amounting to \$302,840 have been paid to these institutions since the organization of the Foundation on March 12, 1942.

PERSONALS

Central States

ADDISON D. ALDRICH, M.D., of Houghton, Mich., has been named Director of the Houghton-Keweenaw-Baraga Health Department.

HENRY H. ASHER, M.D.,† of Topeka, Kans., has resigned as Director of the Division of Local Health of the Kansas State Board of Health, to become Health Officer of Alger and Schoolcraft Counties, Mich.

JOSEPH H. CHIVERS, M.D., Medical Director of the Crane Company, Chicago, Ill., has been appointed Chairman of the Advisory Committee to the Illinois State Division of Industrial Hygiene, succeeding the late PHILIP H. KREUSCHER, M.D.

MORDECHAI A. ELSTEIN, M.D.,† of Escanaba, Mich., was recently named Health Officer of Delta County, it is reported.

SYDNEY J. HEELEY, M.D., of Barton, Ohio, has been appointed Health Commissioner of Jefferson County.

JEROME J. SIEVERS, M.D., M.S.P.H.,* who has been Assistant to the Chief of the Division of Communicable Diseases, Illinois State Department of Health, and formerly a district health superintendent, has been appointed Assistant State Health Director of the Department under ROLAND R. CROSS, M.D., Director.

Eastern States

NEWTON J. T. BIGELOW, M.D., of Brentwood, N. Y., Clinical Director

of the Utica State Hospital, Utica, N. Y., has been appointed Superintendent of the Hudson River State Hospital, Poughkeepsie, N. Y., and Acting Assistant State Commissioner of Mental Hygiene. Dr. Bigelow will "fill the military absence of the present Assistant Commissioner, HARRY BECKETT LANG, M.D., of Albany."

JOHN MOORE CAMPBELL, JR., M.D., former Director of Health Conservation, has been appointed Deputy State Secretary of Health in Charge of Medical Affairs in Pennsylvania, Harrisburg, Pa. Dr. Campbell has been a member of the State Health Department for many years.

WARREN B. RAWLINGS, V.M.D.,† has resigned his position as Assistant Director of the Biological Laboratories of the Pitman-Moore Company, Zionsville, Ind., to accept a position as Production Director of the Reichel Laboratories, Inc., Kimberton, Pa.

CYRIL TASKER entered upon his duties as Director of Research of the American Society of Heating and Ventilating Engineers, New York, N. Y., on October 1. For the past 13 years, Mr. Tasker has been a member of the staff of the Ontario Research Foundation and carried on investigations relating to fuels and a variety of problems connected with heating and air conditioning.

NEAL N. WOOD, M.D.,† of Mackinac Island, Mich., Health Director of Charlevoix, Emmet, Otsego, and Antrim Counties, has been appointed in charge of the Bay County Department of Health, succeeding DOUGLAS A. FRYER, M.D., D.P.H.† Bay City, resigned.

Southern States

CHARLES E. BALLARD, M.D., of Alledale, S. C., former Health Officer for Oconee and Pickens Counties, has

been appointed Health Officer for Beaufort County. EDMOND J. BRYSON, M.D., of Liberty, former Health Officer of Greenwood County, will now serve in this capacity in Oconee and Pickens Counties, and MAULDIN J. BOGG, JR., M.D., of Abbeville, Health Officer of Abbeville and McCormick Counties will also direct the Greenwood County Health Department until a successor to Dr. Bryson is named.

AGNES L. BROWN, M.D., of Hardinsburg, Ky., has been named Health Officer of Muhlenberg County.

BENJAMIN M. DRAKE, M.D.,† of Carthage, N. C., has been appointed full-time Health Officer of Rockingham County, succeeding DOUGLAS H. FLYER, M.D.

JACOB D. FARRIS, M.D., formerly college physician at Eastern Kentucky State Teachers College, Richmond, Ky., now occupies a similar position at Emory University, Atlanta, Ga.

THEODORA A. FLOYD, R.N.,† former Associate Director of Public Health Nursing in the State Department of Health in Georgia, has been appointed Regional Consultant Nurse for the Children's Bureau in the Southeastern area, with headquarters in New Orleans. Miss Floyd was formerly the MCH Consultant Nurse in the Territorial Department of Health in Hawaii and Director of the Public Health Nursing course at the University of Hawaii.

O. M. GOODLOE, M.D., C.P.H.,† who has been Assistant Director of the Bureau of County Health Work in the Kentucky State Department of Health, Louisville, has been appointed Deputy Health Officer and Director of the Bureau of Maternal and Child Health in the Health Department in Peoria, Ill., under DR. S. M. MILLER,* Commissioner. His appointment was effective October 1.

PHARES Y. GREENE, M.D.,† of Graham, N. C., has resigned as Health Officer of Alamance County, effective August 1, to devote his full time to private practice.

JAMES F. HACKNEY, M.D., M.P.H.,† has been made Director of the Health Department of Atlanta, Ga.

ROBERTS A. HEARN, M.D.,† assigned by the U. S. Public Health Service as Director of Industrial Hygiene, Arkansas State Board of Health, has resigned to become Medical Director of the Indiana Division of the Republic Aviation Corporation, it is reported.

EDWARD ALEX HEISE, M.D.,† has been appointed to direct the Sumter County Board of Health for the City of Sumter and Sumter County, S. C.

ROSCOE P. KANDLE, M.D., M.P.H.,† of the Calcasieu Parish Health Unit, Lake Charles, La., has been appointed Director of the Division of Local Health Service, Louisiana State Department of Health, New Orleans. This position was formerly held by C. L. MENGIS, M.D.,† who has been appointed Director of the Ouachita Parish Health Unit, Monroe, La.

EDMOND G. KLAMKE, M.D., M.P.H.,† formerly Director of the Webster Parish Health Unit, has been appointed Director of the Alexandria-Rapides Health Department, and Health Officer of Rapides Parish and the City of Alexandria, La.

ELIAS W. LANGS, M.D.,† Assistant Surgeon, U. S. Public Health Service, has been appointed Health Officer of Norfolk County.

LLOYD W. LUTTRELL, M.D., of Walterboro, S. C., has been appointed to direct the health department of Colleton and Hampton Counties which have been combined into one unit.

CHESTER R. MARKWOOD, M.D.,† of Glasgow, Ky., has resigned as Health Officer of Allen, Barren, and Monroe

Counties, to engage in private practice at Cave City.

DONALD B. McMULLIN, Sc.D.,† Associate Professor and head of the Department of Hygiene and Public Health and Associate Professor of Bacteriology, University of Oklahoma, School of Medicine, Oklahoma City, Okla., was selected by the Committee on the Teaching of Tropical Medicine of the Association of American Medical Colleges to go to Central America during the month of September to observe methods of tropical disease control. Dr. McMullen was to spend about three weeks at a United Fruit Company Hospital and at least a week with the local field unit of the office of the Coördinator of Inter-American Affairs.

WILLIAM G. MORGAN, M.D., of Owensboro, Ky., recently resigned as Director of the Daviess County Health Department, to accept a similar position in Montgomery County.

JAMES O. NALL, M.D., of Marion, Ky., has resigned as District Health Officer of Crittenden, Lyon, and Caldwell Counties, to devote his time to private practice.

CHARLES P. POPE, M.D. JR., Health Officer of Chesterfield-Marlboro Health District, has been appointed to a similar position in Aiken County, S. C.

J. ALLEN SCOTT, Associate Director of the Division of Malaria and Hookworm Service, Georgia Department of Public Health, has resigned to become Senior Statistician of the Division of Vital Statistics of the U. S. Bureau of the Census, Washington, D. C.

SAMUEL D. STURKIE, M.D., former Health Director for the Marion-Bristol area, has been named Director of Public Welfare in Lynchburg,

* Fellow A.P.H.A.

† Member A.P.H.A.

Va. He succeeds the late Mosby G. PERROW, Ph.D.*

Western States

FRANCIS E. C. BALLARD, M.D., M.P.H.,† of San Francisco, Calif., Medical Officer of the State Bureau of Industrial Health, has been placed in charge of the Industrial Hygiene Division of the Los Angeles City Department of Health.

CARL W. CLARK has been appointed to succeed DAVID C. CLEAVE, M.D., as Health Officer of Belvedere, Calif.

STANLEY E. COFFEY, M.D., was recently appointed Health Officer of the City of Orland, Calif., succeeding THOMAS H. BROWN, M.D.

WILLIAM H. GAUB, C.P.H.,* U. S. Public Health Service, has been lent to the Colorado State Board of Health to serve as Director of the Division of Laboratories, following the resignation of FRANCES M. McCONNELL-MILLS, M.D.,† of Denver.

ZERAH P. KING, M.D.,† was appointed Health Officer of the City of Sanger, Calif., succeeding BENJAMIN H. VIAU, M.D.

CLIFFORD V. MASON, M.D., Assistant Superintendent of the Fairmont Hospital of Alameda County, has

been appointed Health Officer of San Leandro and Alameda County to succeed STANFORD F. FARNSWORTH, M.D.,† who resigned to become Health Officer of Oakland.

COURTNEY SMITH, M.D., DR.P.H.,* of the staff of the U. S. Public Health Service, has been appointed Regional Medical Officer of the 9th Civilian Defense Region with headquarters in San Francisco. Before entering the service a year ago Dr. Smith served in Alaska with the Territorial Department of Health after some years as Deputy Health Officer in the Portland, Ore., Department of Health.

CONFERENCES AND DATES

American Education Week—Sponsored jointly by the National Education Association, the American Legion, the U. S. Office of Education, and the National Congress of Parents and Teachers. November 7-13.

American Library Association—Midwinter Conference. New York, N. Y. December 4-5.

American Society of Anesthetists. New York, N. Y. December 9.

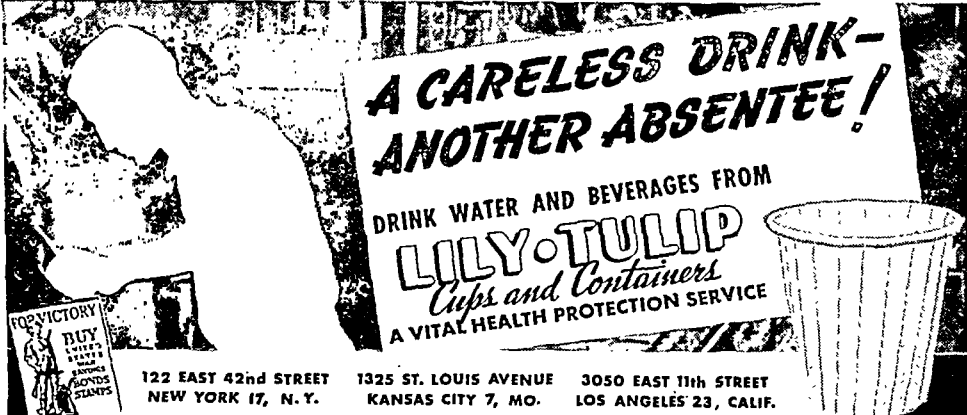
American Society of Heating and Ventilating Engineers—50th Anniversary Meeting, New York, N. Y. January 31, February 1, 2, 1944.

American Water Works Association—North Carolina Section—Hotel Robert E. Lee, Winston-Salem, N. C. November 1-3.

West Virginia Section—Clarksburg, W. Va. November 4-5.

* Fellow A.P.H.A.

† Member A.P.H.A.



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Penicillin Treatment of Early Syphilis*

A Preliminary Report

JOHN F. MAHONEY, M.D., R. C. ARNOLD, M.D., AND
AD HARRIS

U. S. Marine Hospital, Staten Island, N. Y.

THE number of diseases and infections which are favorably influenced by penicillin therapy continues to increase as experience in the use of the drug is gained. It is the purpose of the present report to record, in a preliminary way, certain observations which have been made in four patients with early syphilis (primary) who were treated with penicillin only.

A study of the usefulness of the drug in the management of syphilis was undertaken after limited animal experimentation indicated that penicillin

possessed some spirocheticidal activity. The plan of study embraced the concurrent carrying out of a complete delineation of the effectiveness of the drug in experimental syphilis in rabbits and the conduct of a small pilot study of the effects produced in patients with early disease. The prompt resort to the human being was sponsored by the general non-toxic character of the drug and by the knowledge that observations as to early effectiveness could be carried out without placing in jeopardy the patient's chance for ultimate recovery in event it became expedient to resort to conventional arsenic therapy.

The early results in the animal phase of the general study indicate that the time-dose relationship will prove to be as important in this therapy as in the use of other chemotherapeutic agents. Failures to sterilize experimentally infected animals with treatment schedules which utilize minimal amounts of the drug over a brief treatment period are predictable. The results from treat-

* From U. S. Marine Hospital, Staten Island, N. Y. Medical Director William Y. Hollingsworth in Charge.

This study was undertaken at the request of the Committee on Chemotherapeutic and other Agents, Division of Medical Sciences, National Research Council, acting for the Committee on Medical Research of the Office of Scientific Research and Development. The penicillin was furnished through a contract between the Office of Scientific Research and Development and the Massachusetts Memorial Hospitals.

Presented before the Epidemiology Section of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 14, 1943.

RESULTS OF SEROLOGY
Case 1—L. W. Hospital No. 116769. Duration of Disease—9 Days.

| Days after Start of Therapy | Qualitative Methods | | | | | Quantitative Methods | | |
|--------------------------------------|--------------------------|------------------|--------------------------|------------------------|-----------------|----------------------|--------------------------|----------------------|
| | Kline Excl. Ppton. | Mazzini Floc. | Kline Diag. Ppton. | Kahn Std. Ppton. | Hinton Floc. | Eagle Floc. | Kolmer Simp. C. F. | Kolmer Comp. Fix. |
| 0 | .. | 4 | .. | 4 | Pos. | Pos. | 4 | 4 4 4 4 1 |
| 1 | .. | 4 | .. | 4 | Pos. | Pos. | 4 | 4 4 4 4 3 |
| 9 | 4 | 4 | 4 | 4 | Pos. | Pos. | 4 | 4 4 4 4 2 |
| 23 | .. | 4 | .. | 3 | Pos. | Pos. | 4 | 4 4 3 ± |
| 30 | 4 | 4 | 3 | 3 | Pos. | Pos. | 4 | 4 4 2 ± |
| 37 | 4 | 4 | 1 Dbt. | 3 | Dbt. | — | 3 | 3 3 2 ± |
| 44 | 3 | 4 | — | 1 Dbt. | — | — | 4 | 4 4 4 1 ± |
| 51 | 1 Dbt. | 4 | — | — | — | — | — | — |
| 58 | 1 Dbt. | 2 Dbt. | — | — | — | — | — | — |
| 65 | 2 | 2 Dbt. | — | — | — | — | — | — |
| 72 | 1 Dbt. | 2 Dbt. | — | — | QNS | — | 2 ± | — |
| 80 | — | 2 Dbt. | — | — | — | — | 2 | — |
| 86 | — | 1 Dbt. | — | — | — | — | 1 | — |
| 93 | — | 1 Dbt. | — | — | — | — | — | — |
| 101 | ± Dbt. | 1 Dbt. | — | — | — | — | — | — |

RESULTS OF SEROLOGY
Case 2—E. D. Hospital No. 117096. Duration of Disease—10 Days.

| Days after Start of Therapy | Qualitative Methods | | | | | Quantitative Methods | | |
|--------------------------------------|--------------------------|------------------|--------------------------|------------------------|-----------------|----------------------|--------------------------|----------------------|
| | Kline Excl. Ppton. | Mazzini Floc. | Kline Diag. Ppton. | Kahn Std. Ppton. | Hinton Floc. | Eagle Floc. | Kolmer Simp. C. F. | Kolmer Comp. Fix. |
| 0 | 3 | 3 | ± Dbt. | 3 | Pos. | Pos. | 4 | 4 4 3 1 ± |
| 1 | 4 | 4 | ± Dbt. | 3 | Pos. | Pos. | 4 | 4 4 4 3 |
| 9 | .. | 4 | .. | 2 | Pos. | Pos. | 4 | 4 4 3 ± |
| 23 | 1 Dbt. | 2 Dbt. | — | ± Dbt. | — | — | 1 | 1 2 ± |
| 30 | 1 Dbt. | 1 Dbt. | — | — | — | — | ± Dbt. | ± |
| 37 | — | 1 Dbt. | — | — | — | — | 4 | 4 3 2 1 ± |
| 44 | — | — | — | — | — | — | — | — |
| 51 | — | 1 Dbt. | — | — | — | — | — | — |
| 58 | — | — | — | — | — | — | — | — |
| 65 | — | — | — | — | — | — | — | — |
| 72 | — | — | — | — | — | — | — | — |
| 79 | — | — | — | — | — | — | — | — |
| 94 | — | — | — | — | — | — | — | — |

RESULTS OF SEROLOGY

Case 3—H. J. Hospital No. 117136. Duration of Disease—8 Days.

| Days alter Start of Therapy | Quantitative Methods | | | | | | | | | | Kolmer Sim p. C. F. | Qualitative Methods | | | | | | | | | |
|--------------------------------------|--------------------------|------------------|--------------------------|------------------------|-----------------|----------------|---------------------------|------------------|----------------|----------------------|---------------------------|---------------------|--|--|--|--|--|--|--|--|--|
| | Kline Excl. Ppton. | Mazzini Floc. | Kline Diag. Ppton. | Kahn Std. Ppton. | Hinton Floc. | Eagle Floc. | Kolmer Sim p. C. F. | Mazzini Floc. | Kahn Ppton. | Kolmer Comp. Fix. | | | | | | | | | | | |
| 0 | 4 | 4 | 2 | 4 | Pos. | Pos. | 4 | 4 3 2 1 | 4 4 4 4 2 | 4 4 4 4 3 1 | | | | | | | | | | | |
| 1 | 3 | 4 | 2 | 4 | Pos. | Pos. | 4 | 4 4 2 1 | 4 4 4 4 2 | 4 4 4 4 3 1 | | | | | | | | | | | |
| 8 | .. | 4 | .. | 4 | Pos. | Pos. | 4 | 4 4 3 1 | 4 4 4 3 2 | 4 4 4 4 1 ± | | | | | | | | | | | |
| 15 | .. | 4 | .. | 3 | Pos. | Pos. | 4 | 3 3 2 1 | 4 4 4 2 ± | 4 4 4 4 2 | | | | | | | | | | | |
| 22 | 3 | 3 | 1 Dbt. | 2 | Pos. | Pos. | 4 | 2 1 1 1 | 4 3 1 | 4 4 4 4 4 ± | | | | | | | | | | | |
| 29 | 1 Dbt. | 1 Dbt. | — | 2 | Dbt. | — | 4 | 1 1 1 | 2 ± ± | 4 4 4 4 4 | | | | | | | | | | | |
| 36 | — | 1 Dbt. | — | — | — | — | 2 | 1 1 1 | — | 2 1 2 ± | | | | | | | | | | | |
| 43 | — | — | — | — | — | — | 4 | — | — | 4 4 4 3 1 | | | | | | | | | | | |
| 50 | — | — | — | — | — | — | — | — | — | — ± 1 ± | | | | | | | | | | | |
| 57 | — | 1 Dbt. | — | — | — | — | — | — | — | — ± 1 | | | | | | | | | | | |
| 64 | — | — | — | — | — | — | — | 1 | — | — | | | | | | | | | | | |
| 71 | ± Dbt. | 1 Dbt. | — | — | — | — | — | 1 | — | — | | | | | | | | | | | |
| 78 | — | — | — | — | — | — | — | — | — | — | | | | | | | | | | | |
| 85 | — | 1 Dbt. | — | — | — | — | — | — | — | — | | | | | | | | | | | |
| 93 | — | — | — | — | — | — | — | 1 | — | — | | | | | | | | | | | |

RESULTS OF SEROLOGY

Case 4—S. I. Hospital No. 117491. Duration of Disease—8 Days.

[illegible]

ment schedules which utilize larger amounts of the drug and more prolonged treatment periods will require observation for approximately one year for complete evaluation.

Four male patients have been treated and observed for a period sufficiently long to permit comparison with results produced by more conventional forms of treatment. Each patient displayed a single penile ulceration. Darkfield examination revealed characteristic *Treponema pallidum* in numbers varying from 2 to 10 per microscope field. The duration of the ulcerations averaged 8 days. Not any local or systemic therapy was employed other than that recorded below. The serologic status prior to therapy is indicated in the individual charts.

The penicillin treatment consisted of an intramuscular injection of 25,000 units of the drug at 4 hour intervals, night and day, for 8 days. The total number of injections was 48, and the total amount of the drug was 1,200,000 units. The gluteal muscle was the site of injection.

Darkfield studies of secretions collected from the primary lesions were carried out at 4 hour intervals following the beginning of treatment. Not any spiral forms were observed after the 16th hour.

Some mild but definite clinical manifestations were observed during the first 8 hours of treatment. The patients complained of general malaise and mild headache. Temperature elevations not in excess of 2°F. were recorded. The penile lesions became painful and the regional lymph glands became enlarged and tender. One patient displayed a maculo-papular skin eruption resembling secondary syphilis over the trunk and thighs. The eruption was of short duration. No symptoms, either early or late, were observed which could be construed as representing toxic response to the drug. The repeated use of the gluteal

muscles as a site for injection did not give rise to irritative sequelae.

Because of the importance of the serologic reactions as an index of the response to treatment, a comprehensive routine of serodiagnostic tests was employed. As representative of the super-sensitive procedures, the Kline Exclusion method was included. Of the flocculation tests set at a diagnostic level, the Kline Diagnostic, the Kahn Standard, the Eagle, Hinton, and Mazzini were employed. The Kolmer technic was the only complement-fixation method used. In addition to the above, quantitative titrations were carried out utilizing the Kolmer, Kahn, and Mazzini methods. The results produced by the various methods are displayed in the individual charts.

The results of the blood studies indicate that the therapy was responsible for a more or less rapid and complete disappearance from the blood stream of the reacting substance which is measured by the various tests and which is usually associated with activity in early syphilis.

The further observation of the group of patients will be maintained upon a weekly basis for as long as possible for the purpose of detecting any tendency toward a recurrence of positive serologic findings and for the recording of evidence of clinical relapse. The patients will again be hospitalized for the collection of a specimen of spinal fluid and for a complete medical survey at the expiration of 6 months post-treatment observation. Subsequent hospitalization for special study will be repeated as frequently as may seem desirable. To the information supplied by this group will be added the contributions supplied by additional patients treated in an identical manner until the total material is of dimensions which warrant the drawing of final and sound conclusions.

Should the more extensive and pro-

longed experience confirm the impression which is to be gained from the pilot study, a rebuilding of the structure of syphilis therapy may become necessary. The development of an optimal therapy will require carefully controlled studies designed to determine the most effective relationship between the amount of drug and the duration of the treatment period. Also the rôle of the treatment in latent disease and visceral and central nervous

system syphilis will require careful scrutiny before the reasonably effective measures which are available at present may be replaced by a therapy based upon penicillin. Because of the long post treatment period of observation which is a requisite for the evaluation of a syphilis therapy, the progress toward the adoption of a new mode of treatment must, of necessity, be deliberate.

Penicillin Therapy in Sulfonamide-Resistant Gonorrhea in Men*

C. J. VAN SLYKE, M.D., R. C. ARNOLD, M.D., AND
M. BUCHHOLTZ, M.D.

U. S. Marine Hospital, Staten Island, N. Y.

BECAUSE of the limited supply of penicillin, most of which is required for the treatment of the more serious infections, the developmental work in penicillin therapy of gonorrhea has not advanced as rapidly as might seem desirable. The results recorded herein indicate, however, that a larger supply may significantly affect both the method of treating the individual patient and the incidence of the disease.

Up to the present only two reports dealing with the general subject have appeared in American literature. The initial publication was that of Herrell, Cook, and Thompson¹ which presented the results obtained in the treatment of 5 patients with sulfonamide-resistant gonorrhea. Intravenous administration was practised and the results were favorable. The second report² dealt with the preliminary findings in a group of 75 male patients treated with penicillin in a uniform manner.

This second report is reviewed briefly in order to correlate it with the results of the later time-dose ratio investigations.

The patients included in the previously reported group were young men in a good state of health with the exception of the gonococcic urethritis.

All had failed to attain cure through one or more courses of sulfonamide drugs. The average duration of disease at the time of penicillin therapy was 45 days. The diagnosis was confirmed by positive spread and culture findings. The treatment consisted of the intramuscular injection of 10,000 units of the drug every 3 hours for a total of 16 injections. This schedule provided a treatment period of 45 hours.

This therapy resulted in 74 satisfactory results and one instance of failure which could be directly charged to the drug. An additional patient underwent a recurrence of clinical gonorrhea and has been classed as a relapse, although the possibility of reinfection was present. There was no evidence of immediate or delayed toxicity.

The routine dosage of 160,000 units of penicillin over a 45 hour period, represented an arbitrary selection. That it represented the use of an excessive amount of the drug was appreciated. The second portion of the general study concerns itself with the determination of the minimal amounts of drug and the shortest treatment period which would produce an acceptable cure rate. In approaching this problem varying schedules of dosage and treatment periods were surveyed in 5 additional patient groups. As in the preliminary group of 75 patients, penicillin was administered intramuscularly to these patients only after the diagnosis had been con-

* From U. S. Marine Hospital, Staten Island, N. Y. Medical Director William Y. Hollingsworth in Charge.

Presented before the Epidemiology Section of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 14, 1943.

CHART I

| <i>Penicillin Therapy in Gonorrhea</i> | | | | | |
|--|-----------------------|---------------------|------------------------|-----------------------|---------------------|
| <i>Group</i> | <i>Number Treated</i> | <i>Number Cured</i> | <i>Number of Doses</i> | <i>Units per Dose</i> | <i>Total Dosage</i> |
| <i>A</i> | 75 | 74 | 16 | 10,000 | 160,000 |
| <i>B</i> | 23 | 23 | 5 | 20,000 | 100,000 |
| <i>C</i> | 25 | 21 | 4 | 25,000 | 100,000 |
| <i>D</i> | 25 | 24 | 5 | 15,000 | 75,000 |
| <i>E</i> | 15 | 12 | 5 | 10,000 | 50,000 |
| <i>F</i> | 15 | 15 | 6 | 20,000 | 120,000 |

firmed by culture findings. These further treatment schedules were as follows:

Schedule B—There were 23 patients in this group; 21 had not responded to previous sulfonamide therapy. Each received 5 intramuscular injections of 20,000 units of penicillin at 3 hour intervals. The period of treatment was 12 hours, and the total amount of drug, 100,000 units. All of the patients of this group satisfied the criteria of cure and in follow-up observations, amounting to 14 weeks in some instances, did not show any tendency toward a recurrence of symptoms.

Schedule C—A total of 25 patients were treated by intramuscular injections of 25,000 units given at 3 hour intervals for a total of 4 injections. Eight had not received sulfonamides. The total amount of drug was 100,000 units, and the treatment period 9 hours. Twenty-one of the patients of this group

attained satisfactory results and 4 failed.

Schedule D—In this series of 25 patients, 6 of whom were without previous sulfonamide therapy, the total dosage was reduced to 75,000 units. Injections of 15,000 units were given at 3 hour intervals, a total of 5 injections covering a 12 hour treatment period. There was one patient in this group who was classed as a treatment failure.

Schedule E—In a group of 15 patients (only 2 had not been treated with sulfonamides) the total amount of drug was reduced to 50,000 units. Intramuscular injections of 10,000 units were given at 3 hour intervals for a total of 5 injections over a treatment period of 12 hours. Three of the patients of this group were classed as treatment failures. Two of these three failure cases were treated a few days later with a total of 120,000 units as described in Schedule

F. Both of these patients were cured.

Schedule F—A total of 15 patients were included in this series. Sulfonamide therapy had failed in 11 of the 15. The total dosage was increased to 120,000 units administered at 3 hour intervals for 6 injections over a treatment period of 15 hours. All of the patients in this group were classed, tentatively, as having attained cure status. This group was in the process of being expanded to adequate proportions at the time this research was halted.

DISCUSSION

The response of gonorrhea to penicillin therapy has been dramatic. The matter of ascertaining the minimal amount of the drug which is effective is important because of the limited supply, cost, and usefulness of the drug in more serious infections. From the results obtained by the patients in the various groups it seems logical that one optimal treatment routine will call for 120,000 units of penicillin administered over a 15 hour period. It is obvious that the group must be enlarged before final conclusions can be drawn and that

further experience may point to a more accurate refinement of this schedule.

Because of the present need for conserving penicillin a second optimal treatment schedule could call for 50,000 units, possibly similar to that employed in Schedule E, and the re-treatment of the failures with larger dosage.

There was no apparent difference in the response of gonococcic infections to penicillin between untreated patients and those who had failed to respond to the administration of sulfonamides.

CONCLUSIONS

A treatment schedule consisting of 6 intramuscular injections of 20,000 units of penicillin, administered at 3 hour intervals over a treatment period of 15 hours, was found to be satisfactory in the management of gonorrhea in men.

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Planning Today for Public Health Administration Tomorrow^{*}

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MEASURED by individual and collective health of our people, we, as public health workers, can derive satisfaction from our view of the attainments which have led up to the present state of efficiency in our field. As we make ready to tackle further and more difficult problems, we gain a new enthusiasm from obstacles already overcome. A review of public health progress and developments at each annual meeting, serving as it does as a tonic and a stimulus to further achievement, has become traditional. However, the urgency of the conference this year suggests that we omit this time-honored reflection in the interest of more pressing considerations.

Since the outbreak of the war, public health has gone far in protecting troops and civilians alike from disease. Measures developed during peacetime and wartime have been put to work on every front, with the result that few serious epidemics have occurred. The health status of the American people has been comparatively good. This contribution to the efficiency of the war effort and to ultimate victory is recognized.

Now that we are beginning to turn our eyes to the winning of the peace, it becomes no less important that we have a strong, physically fit population. Civilization will have to be rebuilt on

a more enduring basis, and public health will be a vital factor in attaining this goal. Already it is one of the principal subjects of discussions and considerations of post-war planning by medical and public health organizations in this country.

As distances evaporate, we suddenly find ourselves one large neighborhood or community in which there can be no absolute or lasting security for any one group unless such security be provided for all. Particularly is this true with regard to *health* security. Many diseases which seem remote because of our excellent public health structure, which it has taken more than seventy years to build, still present a problem in other areas not so fortunate as to have the benefit of years of health experience. Transmission of these diseases to the unaffected populations grows increasingly apparent. The speed of air travel from every section of the globe will make it difficult always to detect disease carriers. Likewise, the dislocation of populations presents problems of tuberculosis control, dysentery, malaria, and others unless health measures for control are adequate. Potentially dangerous conditions which might establish new disease problems in this country or aggravate old ones loom on the public health horizon at this time and present a maze of new and complex problems for solution. Whatever ingenuity and resourcefulness may be necessary to untangle these problems, public health

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forces in this country as well as in other countries can be counted upon to apply. Public health workers have never shied away from hard and difficult tasks and they will not do so now when so much depends upon individual and collective efforts.

These goals which we are setting call for a public health organization of the most efficient character. Planning is already under way. Urgency of immediate needs must not be allowed to overshadow the plans for the future. Our public health plans for the future—that is, after the war—are being laid now, notwithstanding the extreme shortages of public health and medical personnel taken up by the armed forces and war industries. I am thinking particularly of diseases that may be brought home from the battlefields of the world, especially tropical diseases such as various forms of malaria and the dysenteries, because until recently medical science had been unable to cope successfully with these diseases. Efforts of all public health workers must be combined with sound, intelligent thinking and action. Make no mistake, there is a tremendous job ahead. If it is well executed, there will be few idle moments on anyone's hands.

It is believed necessary to consider first our doorstep problems. The word "doorstep" is preferred to "home front" because we certainly must remove whatever is on our own doorstep before we can travel beyond.

Doorstep diseases that present a serious threat to public health and will respond to a sound program of control are the deficiency diseases, malaria, gastrointestinal ailments, typhoid fever, various infectious diseases, and problems of rehabilitation arising out of the war. We must catch up with the work which was already pending before this crisis—and some of it has been pending for fifty years. To tolerate the existence of wholly preventable diseases in our midst

(typhoid fever as an example) is disgraceful. We can and must eliminate these conditions responsible for lowering the physical and economic status of our people. This is our first mission as public health workers.

Personal application and appreciation of public health is an essential doorstep problem. Absorption of the great public health truths because of association with public health has not worked. Some guidance is absolutely necessary.

Too few of the health departments of the country are following the notable example of efficient industrial organizations and others in keeping employee health records. From the standpoint of the organization and the individual, is it not a good thing? We cannot hope for the most effective results in our health teachings until such time as public health workers personally apply the protective measures they advocate. The fact that great numbers are not now doing so would indicate a need real and urgent. There has been a tremendous turnover in personnel since the outbreak of the war and a fertile field provided for educating a large number of people. Many of these new workers have had their first glimpse into the workings of public health. The requirements for a health check-up periodically must be set forth. Human nature being what it is, some prodding is often necessary among the best of us. This should, therefore, be the responsibility of the organization. Essential records should be kept for the purpose of informing individuals of such things as needed immunizations, chest x-rays, laboratory tests, periodic physical check-ups, dental certificates, and so on. Once such a routine is established, the employee will discover the security and satisfaction which comes from eliminating preventable disease worries and physical incapacities. Active tuberculosis in a health department spreads in the same way as active

tuberculosis outside the health department. As depicted in "Susan and God," sometimes it seems that we go forth in every direction to do public good, leaving our own household unattended.

And still another doorstep problem is the organization of public health at the local level. Until each of the more than three thousand counties in the United States has within reach, either through a district health department or a county health department, full-time health protection, we should not consider lend-leasing public health. Like schools, churches, post offices, public health must be "on the ground" to serve the people. And just one word in behalf of housing community health programs: We should not be satisfied to undertake one of the most important social security programs from the basement of the courthouse or the third floor of a run-down office building. We should insist upon adequate public health facilities.

The horizon of public health presents many problems which must be solved without delay. There is a clamor for increased services in every direction. This tremendous load thrust upon the shoulders of public health would be too great a task to assume alone; but the vast facilities of the medical, dental, nursing and allied professions are being utilized. Participation on the part of physicians, public health workers, and others is necessary, but it is likewise necessary that the individual be urged on by education to assume an increasing share of personal responsibility for putting to work the vast knowledge which has been accumulated regarding sound health practices. Long-wished-for development of effective measures against such diseases as malaria, cardiovascular diseases, cancer, tuberculosis, virus infections, and certain mental afflictions will provide still further public health tools to utilize in the program

for the welfare of mankind. In the meantime, while looking forward in happy anticipation to such developments, it might prove of more immediate value to try to perfect some of the tools we already have—many becoming rusty from disuse.

To prevent physical incapacities and disease and to promote health, the periodic health check-up for the general population has long been a paramount item in our public health teaching. No worker has failed to point out its value. If we are to keep faith with those to whom we have advocated this procedure, I think it is time to plan for a greater thoroughness in its performance. The American Medical Association, in its desire to help the physician to fulfill certain minimum essentials in conducting the periodic health examination, has issued a manual. In the hands of every member of the profession, this manual would be a public health wedge. In the introductory pages the following statements are found:

The periodic health examination serves to measure the present health status of the individual, subject to the qualification that obscure or insidious disease may not always be discoverable by methods at present available. Further, the examination discloses habits of living and environmental factors which may be unhealthful but susceptible of correction. Finally, of course, it gives opportunity for treatment of early or pre-clinical stages of disease . . . The personal health inventory or periodic health examination, under whatever name it may become most widely known, must be regarded as a concept which has appealed to the intelligent elements of the American people to a somewhat limited extent, but which has in it enough promise of better health to warrant its more widespread popularization and adoption by increasing numbers of our people.¹

Other groups share the responsibility for the public's lack of response to this vitally important health measure. If we hope to divert the public from the ineffective over-the-counter drugstore

practice and the resort to numberless proprietary remedies and patent medicines, to say nothing of the illegal practitioners, something specific must be set forth. Once this is accomplished by a competent committee, such as may be found within the American Medical Association, and put into force by the nation's physicians, one of the major hurdles will be over. Having something definite to sell, it will be much easier for the advocates of the health check-up to sell it.

Sufficient experience in recent years enables the keen observer to realize that a greater program of physician-public health coöperation and participation is not only desirable but also essential in accomplishing the task before us.

Consider the venereal disease program as one example of a disease problem involving great numbers of the population, and presenting a constant threat to public health. It is inconceivable that the progress made to date could have been achieved by either the medical profession or public health organizations working independently of each other. All along, we need a program of participation of physicians aiding the public health program and the health department helping the physician—both serving the health needs of the individual. The dental profession has also coöperated in the public health program and made possible greater progress in this direction. Hospitals are now coöperating with public health in making available service for the wives of soldiers under the emergency maternity and infant care program.

Today we turn our thinking to all community resources realizing that without them our efforts will fail. Brought closer together by the emergency of war, we will not relax our efforts and will not allow worth while programs to decay because of lack of pressure caused by the emergency. I

do not need to point out to you what became of our venereal disease program after the last war—but let this be a reminder that the momentum behind our programs established on a wartime basis must be great enough to continue these as peacetime programs, if need still exists.

As we look ahead, there should be a joining of hands and of hearts of all forces. We now prepare for one of the biggest jobs of all times—that of rehabilitation, rebuilding, and restoration. The states owe a great deal to the U. S. Public Health Service, the Children's Bureau, and other federal agencies, and nonofficial agencies for their fine coöperation and economic assistance. Greater uniformity of procedure among all the states has been achieved as a result of the federal-state relationship in public health. It is true that federal-state relationships with respect to public health administrative policies might be strengthened and made more effective in some instances. We all realize that personnel delegated to work with state and local forces on wartime public health programs have injected varying policies with regard to salary scale, hours of employment, leave, and so on, into public health administration. These obstacles though not great have caused conflicts within the organization. It would doubtless be difficult to have these employees conform fully to the policies of the organization to which they are assigned, but, in due time, these problems will be eliminated.

Thinking of the need of this federal assistance, there is brought forcibly to our attention the impact of the demand for birth certificates created by the war. States operating on a two year appropriation could not expand sufficiently to meet this overwhelming demand, and if it had not been for the fact that we were able to use a small amount of federal funds to keep our heads above water, we would not today be able to

have this important function retained where it rightfully belongs. Being aware of the importance of these vital records to the health program of the United States, a transfer of this function is being sought in order that the U. S. Public Health Service may assist the state divisions of vital statistics to improve registration and to render to the citizens of the states a uniform service. Without such assistance, the states will carry on a less effective service. This is one field that has not been covered by federal assistance in previous years. We have not tapped our resources with regard to public health statistics.

There are other fields opening up for federal assistance. Heretofore, states have operated tuberculosis hospitals and mental hospitals without federal assistance. These might be materially benefited if federal assistance were available. The field here is fertile. For years we have known the value of isolation and early treatment of cases in disease control. Facilities should be made available for an extension of these weapons.

Federal-state relationships can always be maintained on a mutually agreeable basis if each is alert and open-minded. We must guard against invasion of domains, but likewise we must welcome outside assistance that will strengthen. If disease recognizes no barriers and travels freely from one state to another, then public health regulations in certain instances will have to know no barriers and will have to look to interstate control measures. This same policy will one day be applied to global thinking as stricter examinations are required of those entering this country. We help most when we help others to help themselves. This should be our test of assistance whether it be at the global level, the federal level, the state level, or the local level. And our programs of assistance should always be tested by the one measuring rod that will always

keep us in the middle of the road in so far as policies and procedures are concerned—"We should not do for the individual what the individual can well do for himself."

We have not been neglecting altogether global health. Today American-trained public health workers are in Alaska, India, South America and Central America, several European countries, and all places where our armed forces now are operating. As we improve and make more effective our own local public health program, we cultivate a fertile field for the training of global public health workers. We can be of no greater assistance to our neighbors in this world community than to afford opportunities for observation and training. In so far as we ourselves build a sound public health program we assist our neighbors. To assist us in this field, we can now draw upon improved facilities for diagnosis and treatment made possible during the past few years and by wartime developments. Yesterday a chest x-ray was available only to a few; today it may be used as a part of a routine periodic check-up.

In entire counties in many sections of the country all of the public school teachers and pupils of every grade in the school are being given physical examinations periodically — examinations which include chest x-rays, blood tests, and other necessary laboratory tests. This is routine in many of our American communities. All of this and more will be available to people of all countries of the world when the value of public health is accepted internationally.

Greater laboratory facilities, and other aids to diagnosis have brought us a great distance. All of these will be helpful, and we can rightfully expect to see public health integrated into the post-war pattern. It is up to us to furnish the cloth—or the trained public health workers. If we were to say today that we need five thousand trained

public health workers, not one of us could point to a supply. However, if tomorrow we need ten thousand trained public health workers, some of the supply will come from definite training programs which are being instituted in each of the forty-eight states by means of federal assistance, interested philanthropic foundations and funds in this country. The supply of nurses will be greatly increased. The need for trained workers cannot be given too much emphasis. Today we have workers trained in the science of public health to carry on the program. Our number, however, is entirely too small for present, to say nothing of future, public health needs.

Like a pebble dropped in a pool, public health begins with the smallest area (the family), then extends to the community, the state, and the nation, and now may extend to all shores be-

yond. From this close association as a member of a world neighborhood, we will benefit from an exchange of ideas, from an exchange of public health plans. Public health seed can grow where the soil is fertile, where public opinion is favorable. Much soil must be fertilized. The maximum development of the individual from the standpoint of health and physical fitness must be accomplished if progress is to be made and civilization advance. American public health leadership accepts, after more than seventy years of preparation, the challenge, and pledges its full resources and talents to the continued conquest of disease in our own country and abroad.

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The Evolving Pattern of Tomorrow's Health

I. Prerequisites to Improved Public Health*

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OBVIOUSLY, the first prerequisite to improvement of public health in any locality is a properly constituted health department. As quickly as possible, therefore, all areas and all population units should be provided with modern local health agencies directed by trained medical health officers.

In this undertaking, as well as in others to be discussed later, we shall probably be compelled to begin from a point considerably behind that which we had reached in 1940. That year will serve as a good point of reference, since it is the last year in which conditions were more or less normal.

Of the 3,070 counties in the continental United States, only 655 in 1940 had independent full-time health departments, and 356 had combined with adjoining counties to form local health districts. The remaining two-thirds were without formal health organizations under local auspices. As a rule, only those cities with populations approaching 100,000 employed full-time medical health officers and arranged their health services along modern lines.

Recognizing that the goals of public health cannot be attained through the 38,000-odd units which now make up the political mosaic of this country, the Subcommittee on Local Health Units of the Committee on Administrative Practice has suggested the grouping of counties and their contained municipalities in such a way as to derive 1,127 local jurisdictions. Wherever practicable, these units contain not less than 50,000 population, all of whom reside within 40 miles of the principal trading center of the area. Counties rather than state administrative districts were used in map making, since it was believed that the people to be served will wish to have a voice in the management of their institutions; consequently, they should also bear part of the financial burden.

To the more experienced and weather-beaten health administrators, such a scheme of redistricting may seem entirely visionary and beyond the realm of accomplishment. They know the difficulties inherent in bringing about and perpetuating effective working relationships between political bodies. In the future, however, funds for local health services are likely to be derived in greater measure from state and federal sources than has

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heretofore been the case. With greater centralization of financing, the problem of amalgamation at the local level is certain to become less difficult. Either the scheme suggested by the subcommittee or some modification of it should be accepted by the professional groups without further delay, since plans for the future are dependent upon the establishment of rational service areas. In any event, the structures of state and federal health agencies will need to be strengthened so that they may be in position to supply certain specialized services beyond the resources of local jurisdictions.

When the full-time professional and technical personnel employed by health departments prior to the war are contrasted with the requirements of this proposed scheme of organization, approximately the following deficiencies are noted, despite the decreased number of local jurisdictions and consequent savings in personnel: physicians, 45 per cent; dentists, more than 90 per cent; engineers, 60 per cent; other sanitation personnel, 50 per cent; nurses (public health and visiting nurse services) 75 per cent; laboratory technicians, 45 per cent; and other professional personnel, about 50 per cent. Considerable reduction in these estimates, especially for nurses, could be effected by the employment of auxiliary personnel whose preparation need not be of professional grade. Nevertheless, such a reorganization would involve training programs that exceed present facilities. In addition, arrangements must be made for preparation of those representing normal replacements and of new recruits needed to fill the vacancies made by those who, for one reason or another, do not return after the war.

On the negative side, there seems little hope of attracting to public health work persons of the right types in numbers sufficient for future needs unless

provision is made for selection and promotion on a merit basis, together with reasonable compensation and retirement benefits. Despite innumerable present handicaps, states are rapidly developing their merit system rules and framework of organization. This plan needs to be extended to the local level. Mere installation of a merit system, however, is no guarantee of successful administration; unless the plan has the active support of the workers themselves, backed by their professional bodies, abuses are almost certain to creep in and discredit the system.

In the future, more attention must be given to the quarters health departments occupy. Common decency and self-respect require that health departments be taken out of basements of county court houses and condemned school buildings. The technical nature of those services that health departments will be expected to perform is a more compelling reason for providing proper surroundings and facilities for carrying on the work. Since the start in this direction will be made practically from scratch, we may assume that each of the 1,127 health departments will require a headquarters building costing at least \$75,000. Not fewer than two secondary health centers will be needed for most of the health jurisdictions. Each of these will cost as much as \$35,000, based on current construction prices.

Turning now to sanitation facilities, one still may find many needs that must be satisfied if public health is to go forward. Take, for example, public water supplies, one of the oldest and most fundamental of public health interests. It is estimated that 4,860 communities will need new public water supplies, and extension or improvement will be required for 6,450 of the present systems. Based on current costs, the new systems will entail an expenditure of \$180,000,000 and the exten-

sions and improvements, \$503,000,000.

Second in importance—and a close second at that—is the proper collection and disposal of sewage. A conservative estimate is that 7,690 communities will require new sewer systems and that 5,475 systems now functioning will need extension and repairs when construction can be resumed. The cost of such construction will probably approach \$605,000,000. Installation of new facilities for treatment of domestic sewage and industrial waste through municipal systems for about 10,500 communities and expansion of present facilities for another 2,000 are regarded as essential for safety. An expenditure of roughly \$1,380,000,000 will be needed to effect such improvements in community sanitation.

There are still approximately 4,000,000 rural homes that either have no excreta disposal facilities or are served by insanitary toilets. The estimated cost of providing the minimum accommodations, namely, sanitary privies, is \$140,000,000. Rural domestic water supplies, likewise, are far from satisfactory. About 3,600,000 rural homes are estimated to need new or improved supplies. The total cost of safeguarding this number of private rural water supplies would be about \$180,000,000.

With the type of industrial and agricultural economy prevailing in the continental United States, the hazards of insect-borne and parasitic diseases should be minimal if suitable provisions for necessary construction and maintenance were incorporated in programs of public work. Even malaria need no longer be tolerated. Blood surveys conducted around military establishments and war industries in malarious areas during the past year show the parasite index to be less than two-tenths of one per cent—the lowest on record. Furthermore, the disease is now perpetuated through a limited number of endemic foci. Barring the

introduction and establishment of new strains of the parasite or the occurrence of serious economic disturbance, competent malarialogists believe a well directed program sustained over a period of not more than 10 years should achieve total eradication.

Altogether too little attention has been given by health officers to the changing pattern of disease incidence and to the possibilities for mass application of the newer diagnostic and therapeutic procedures. As a matter of fact, the whole group of acute communicable diseases toward which so much public health effort is directed accounts for less than 3 per cent of general mortality. While these diseases are important causes of morbidity among young children, they occupy a minor rôle as causes of industrial absenteeism. Furthermore, any review of the causes of general morbidity, physical impairment, or gross mortality clearly shows that the greatest advances in public health are to be made in the area of non-communicable illness. Many obstacles involving change in social attitudes, improvements in methods of finance, and relocation of both professional personnel and physical facilities must be recognized and surmounted before substantial progress can be expected.

Traditionally in this country, a man's illnesses have been regarded as his personal affair—something he may endure if he prefers, or from which he may obtain relief if he is both willing and financially able to do so. Gradually, as society has increased its investment in the training and security of the individual, this point of view has become a subject of serious debate. There are signs which clearly suggest that a complete reversal of attitude is in the offing. With such a shift in viewpoint, the means for implementing an enlarged program of medical care assume added importance.

Illness, by its very nature, is not adapted to individual financing. It is an experience not desired; hence most people do not have the incentive to provide for its consequences. Neither its occurrence nor its severity can be predicted for any one person. On the other hand, the illness experience for the nation as a whole, or for significant groups can be foretold with exactness. The costs, when apportioned, are not excessive for any but those in the very-low-income and dependency brackets.

Time will not permit, nor is this the occasion for discussing the relative merits of different schemes for distributing medical risks. Suffice it to say, however, that public health agencies—which presumably represent the consuming public and which are dedicated to raising the general level of health—cannot without losing their proper status refuse much longer to explore methods for extending medical service to all groups of the population. By this is not meant a mere academic or dilettante type of interest, but one that manifests itself in a desire for participation in actual organization and management of operating programs. Let us hope that the action this year of the Program Committee in devoting one general session to health insurance has set a precedent, and that future meetings of this Association may serve as forums for the discussion of proposed plans and accumulated experience in the general field of organized medical care.

Merely providing funds to pay for service, however, will not assure the delivery of medical care. This may be demonstrated today in almost any section of the country and particularly in the boom towns. People have the money to pay for medical care, but there are too few physicians, dentists, and nurses to provide the service.

Especially during recent years, phy-

sicians have tended to congregate in centers of population and wealth. Good roads and improved transportation facilities compensate only in part for reduction in the numbers of rural physicians. Expressed quantitatively, the problem is as follows: In states where less than 30 per cent of the population is concentrated in urban areas, there are available for service only 77 physicians per 100,000 persons; while in states where 70 per cent or more of the total population is classified as urban, there are 163 physicians for the same number of inhabitants. Influence of the economic factor upon availability of physicians is demonstrated by the presence of 147 physicians per 100,000 population in states where the per capita income exceeds \$600 as contrasted with 69 in those where the corresponding index of means is under \$300. In order to bring about an equitable distribution of physicians in relation to population, means must be devised for attracting to underprivileged areas not fewer than 25,000 physicians.

Among the disadvantages of rural areas that discourage the location of physicians is the inadequacy of hospitals and related facilities essential to the practice of modern medicine. For the nation as a whole there is a shortage of 166,000 general hospital beds. About 53,000 of these can be supplied through additions to existing institutions, but the remainder must be distributed among new hospitals, most of which should be located in areas away from the larger centers of population.

Fewer than one-third as many additional hospital beds are needed for tuberculous patients as for those with general illness. More than 50 per cent of the total number of new tuberculosis beds recommended are to meet deficits in the South. As in the case of general and tuberculosis hospital facilities, the southern states also have

extreme shortages in hospital beds for mental patients.

Provision of the required number of hospital beds of various medical types would involve construction costs of at least \$2,000,000,000. A building program of such proportions obviously cannot be undertaken in its entirety at any one time. Careful planning is called for if first needs are to be met first.

Now is the time to proceed with such details as site selection, fiscal arrangements, and the preparation of functional drawings for physical facilities of all types that serve the needs of sanitation and medical care. Without these, delay and confusion will follow later. Unless health departments bestir themselves in these respects, the greatest needs—especially in smaller cities and rural areas—may go unsatisfied even though there be a post-war construction program of large proportions.

With some variations among individuals, the problem of dental caries is practically universal. Yet all surveys emphasize the fact that only a minor fraction of the population receives anything approaching complete dental service. Two obstacles stand in the way of extension of dental service—inadequate numbers of dental personnel and prohibitive costs of care. Under the prevailing scheme of dental practice, from three to four times the present number of dentists would be required for complete dental service. Increased use of auxiliary dental personnel, working under the direction of dentists, would reduce considerably the number of dentists otherwise required and at the same time lessen the cost of care. By concentrating attention on the school age group and repairing carious surfaces as they develop, the consequences of neglect, namely tooth destruction, would be postponed at least to that time in life when the individual would be in a position to assume a larger measure of responsibility for his

own welfare. Despite the lowering of costs which could be achieved by procedures such as those suggested, many careful observers doubt that the problem of dental care can be solved without the development and widespread application of preventive measures which will materially reduce the incidence of caries.

After all the foregoing suggestions for preventing the occurrence of illness and increasing the availability of care have been put into operation, there will still remain even greater possibilities for advancing public health by means of research. Such research should be designed to elicit new and more effective preventive measures, to improve diagnostic and therapeutic procedures, and to lessen the costs thereof. Of course, the needs for and the possibilities in research are infinite, and no one can predict the applicability of any discovery regardless of how irrelevant it may appear at the time. From the standpoint of public health, probably the greatest needs for research are in the fields of mental disorders, acute upper respiratory infections, dental caries, and malnutrition.

Among the disease categories mentioned, mental disorders are outstanding. On any given day the number of persons in mental hospitals alone exceeds the number in general hospitals. Emotional maladjustments and mental aberrations of other types are present on all sides. Notwithstanding the extent of the problem, nowhere in the United States is there in operation a substantial, well conceived, and adequately financed program of basic research. The institutional care of the mentally afflicted is, and for a long time has been, the exclusive monopoly of public agencies; yet little has been revealed to reduce the problem or improve therapeutic procedures. This neglect constitutes a serious indictment of public medical service. Certainly

there is no basis for believing that mental abnormalities are inscrutable if approached through modern methods of research. Those disorders directly attributable to dietary deficiencies readily respond to improvement in nutrition. The malaria treatment of paresis is an example of what may be accomplished with the psychoses of infectious origin. Insulin and other forms of shock therapy indicate quite clearly that the deteriorative processes of schizophrenia and the melancholias can be stabilized and in some instances reversed. Because of its facilities for research and its responsibilities for the care of mental cases, perhaps the federal government should assume more aggressive leadership in this field. It has been suggested that the general pattern established by the National Cancer Institute be followed in projecting a program of research in the field of mental disorders.

In this country at least, man is fairly well protected against those infections he may acquire through ingestion, but no corresponding gains have been made against respiratory infections. Today the latter problem may be no more difficult than the former was some fifty years ago when the work started. With the extension of air conditioning, sterilization of the air we breathe—at least the indoor air which is most heavily laden with infectious material—may not be altogether visionary. A more satisfactory and universally applicable procedure would be some method of increasing human resistance to infection. Better therapeutic agents than those now available should lessen the amount of disability attributable, for example, to the common cold.

The third broad subject for inquiry considered as a prerequisite to improved public health is dental caries. Here is a field wide open for almost every type of investigation. The very few re-

search workers who have explored it are not in agreement as to whether caries results from a single or from many causes; whether the underlying factor is bacterial, chemical, or nutritional; or whether the condition represents some process in no way akin to any of these. As in the case of mental disorders, very little fundamental research is being done, and no program commensurate with the problem seems to be contemplated.

Fortunately, in the instance of dental caries, reliance need not be placed exclusively on the revelation of new facts which may disclose the intimate nature of the degenerative process. There are many possibilities in reparative dentistry that remain to be developed and exploited. Among these may be mentioned new synthetic fillings which would simplify the mechanical job involved and reduce the cost.

Basic research is needed to reveal the ultimate secrets of metabolism in order that efforts to influence body processes by food intake may be definitive. Of more immediate and practical importance are clinical and administrative studies designed to determine the rôle of health agencies in nutritional programs. So far agricultural agencies have carried the major share of the burden with little or no guidance from the medical and allied professions. This situation must be remedied if current information is to be applied understandingly.

SUMMARY

The present concern of all persons interested in public health should be: (1) to hold the gains already made in raising the general health level of the country; (2) to increase these gains by extending the traditional health services now in operation to all segments of the population; (3) to broaden the definition of public health service to include essential elements of general

medical care; and (4) to exploit the possibilities in research.

Several broad avenues of approach might be followed in translating this concern into action. National coverage by full-time health organization may be secured through reorganizing and combining existing health departments and establishing new units in areas where none now exist. Differences in opportunity for receipt of medical care can be corrected by removing economic barriers and by redistributing professional personnel and hospital facilities. Finally, public health should be significantly advanced by concentrating research activities upon the prevention and cure of mental disorders, acute

respiratory infections, and dental caries—diseases and disorders that contribute most to morbidity—and by improving our understanding of nutrition.

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The Evolving Pattern of Tomorrow's Health

II. The Post-War City*

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THE usefulness and the importance of any profession in the social order rests upon the fidelity with which it holds fast to the sound and basic principles developed in the past and the vision with which it adapts those principles to the evolving challenges of the future. The American Public Health Association has an honorable record of more than sixty years of service; and at the end of this period we find a million lives a year being saved upon this continent through the control of tuberculosis, typhoid fever, and other communicable diseases and by the reduction of infant mortality. These results have been accomplished by the twofold approaches which together constitute the science of public health—the control of the environment of man by sanitary science and the upbuilding of the vital forces of man by preventive medicine.

The extent of our future usefulness depends on the degree in which we can apply these well tried principles to the tasks of tomorrow. Those tasks will no longer be concerned only with the negative problem of defense against specific killing diseases, but also with

the problem of upbuilding health and vigor and efficiency and the joy of living in a positive and creative sense. If we shrink from this challenge, public health will crystallize as a necessary but minor cog in the routine machinery of government. If we accept it, our leadership may be as outstanding in the next half-century as it has been in the last.

In a positive view of public health in the post-war period, the home and that aggregation of homes which we call a city must be of central interest. The home is the physical basis of the health of the individual. The city is the ecological background on which the physical and emotional and social soundness of a community depends.

The architect, with whom we must work in this field of the future, has not been slow to realize the intimacy of our relationship. Vitruvius in the first century, A.D., said, "The architect must know the art of medicine in its relation to the regions of the earth." Eliel Saarinen in his book on *The City, Its Growth, Its Decay, Its Future*, published this year, says, "It must be borne in mind that the family and its home are the cornerstones of society, and that man's physical and mental development depend largely upon the character of the environment in which

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he is nurtured as a child, where he spends his manhood, and where he does his work."

It is on account of this intimate relation between the city and the health of its inhabitants that the Committee on the Hygiene of Housing was established by our Association six years ago. This committee has made substantial progress; but it has only just begun its task. We have prepared an outline of the Basic Principles of Healthful Housing which has been cordially accepted by experts in housing as the basis of their plans. We have ready for publication a series of inspection forms and appraisal procedures by which the degree of substandardness of individual dwellings, and of neighborhoods and areas can be determined with a high degree of quantitative accuracy. This procedure offers to the health officer an invaluable instrument for the exercise of his legal power of condemnation and his orders for the improvement of property. It should provide a sound basis for routine sanitary inspection, which in the past has not been one of the most efficient activities of the health department. It will be an inestimable aid in the programming of new housing developments and urban rehabilitation and in the wider reaches of city planning. The committee is now in position to render to health officers (at cost) the same sort of service in this field which the Committee on Administrative Practice has long provided in the general area of health department administrative procedure.

We are at present at work (with the aid of experts in administrative law) on a study of the legal bases of housing control, with special reference to the use of those delegated health department regulatory powers which have been employed with such notable success by Huntington Williams in Baltimore; and we have organized a special

group of expert subcommittees to translate our Basic Principles of Healthful Housing into specific standards to govern post-war home construction.

In all its activities, the Committee on the Hygiene of Housing has recognized that the individual home can only be improved and protected by considering it in relation to its environment. The contributions made by our federal and local Housing Authorities have had their chief significance in the fact that these authorities have created not only sound structures but sound neighborhoods; and our concept of the environment of the healthy individual as extending beyond the four walls of his dwelling must be projected to the city as a whole.

Our cities today are sick; they suffer from the chronic and progressive slum disease. It is no mere figure of speech when we talk of "blighted areas." "Blight" in a city is like blight in a plant or cancer in the human body. It spreads from its center year by year as Howard Green's maps of Cleveland show so clearly. Our cities are decaying at the core; and, in a vicious circle, the taxable values which are needed for rehabilitation are escaping to governmental areas outside the municipal limits. The situation is serious; and the treatment must be radical.

The essential needs which must be met in planning for a healthful city are many. We may enumerate some of the most significant of them:

1. A location for the city in a region where climatic conditions are favorable. No civilization can develop greatness where the climate is too far from a desirable mean.

2. Access to primary sources of food supply. The students of geo-politics are right in their emphasis on the relation of the heartlands and the coastlands; and the strength of the United States is largely due to the fact that it—alone of all the great continental

powers—controls both types of area under a single flag.

3. Adequate and safe water supply. The presence of a spring or well was generally the determining factor in the choice of the site on which a village grew into a city (Blackstone's spring on Beacon Hill in Boston).

4. Sanitation, including particularly protection against vermin which play a rôle in the spread of epidemic disease. The first settlement at Jamestown, Va., had to be abandoned on account of malaria.

5. Protection against enemies. The hill cities of Italy and of early New England were placed on the heights for protection against both malaria and human foes. If we do not combine on a world-wide basis to chain the dogs of war, the hazard of the bomber will be a determining factor in city planning. The dangers of automobile traffic must certainly be an essential factor in such planning.

6. Illumination. The practice of street lighting (first it is said, introduced at Antioch) has been an essential factor in making the growth of the modern city possible.

7. Housing. Most vital of all the elements in a modern city is its housing. To quote again from Saarinen, "The primary purpose of the city is to provide adequate living and working accommodations for its population."

8. Transportation. Convenient circulation between various points in the city and easy access to neighboring communities is obviously essential to sound municipal development. Waterways determined the site of most of our cities. The railroad and the automobile have dictated the lines of their recent evolution. The airplane will profoundly modify their future.

9. Means of livelihood. The health of the city must basically depend on the factories and the fields from which its residents and the environment to

which it furnishes trading facilities procure their livelihood. Many of the new industrial communities developed in the present war emergency will form the centers of new permanent civic areas.

10. Recreation. In the future economy of plenty to which we look forward, it will be increasingly clear that man works to live and does not merely live to work. The shortening of the hours of labor and the years of labor will make leisure time activities of increasing significance as the world of the future is evolved.

11. Facilities for trading. It is too often forgotten that the commercial district of a city is quite as important an element in its prosperity as its industrial development. In cities serving adjacent rural areas, the factor of commerce may be more important than that of industry.

12. Social intercourse. The country store and the market place have served an essential rôle as centers of neighborhood and civic interest. This will be a function of primary interest in planning the city of the future.

13. The school. The little red school house—in its more modern and effective forms—must always be an essential element in healthy community life.

14. The church. The white steeple among the elm trees is the most characteristic symbol of the New England village. The element of community worship meets fundamental human needs which can never be outmoded.

The relative emphasis on these various fundamental needs of community living will vary with the progress of mankind. The half-timbered houses of the medieval town clustered about the cathedral on the hilltop. The baroque city spread itself along broad avenues radiating from the palace of the King. The industrial metropolis of today huddles about the factory. I have sometimes dreamed that the central feature

of the city of the future will be its churches and schools, its playgrounds and its recreation centers, with the fulness of realization of the human personality as its keynote, rather than the dominance of bishop or king or production manager.

Whatever the dominant motif of the city of tomorrow must be, it is clear that such a city must be developed as a whole, with unity, with purpose, as a total expression of the spiritual ideals of its people. The cathedral city and the palace city had a measure of such unity; and they were beautiful places to see, satisfying places in which to live. The industrial city of today has no such unity and no such significance. It is not a healthy biological development but a diseased product of fortuitous and unregulated economic forces. If our civilization is to be worth saving, its cities—and much of its countryside as well—must be rebuilt more nearly according to our heart's desire.

We come then to planning—the deliberate and purposeful and intelligent application of the human mind and the human will—as the only possible solution of our problem. We must plan the homes of the future in the setting of neighborhoods, neighborhoods in the setting of cities, cities in the setting of regional areas, of nations and of the world economy.

For each area we need a master plan drawn up in consideration of the probable population of that area, its industrial and commercial and agricultural future (in the light of its relation to the outside world); a physical plan which will provide for the roads and streets and utilities, for industrial and commercial centers, for recreation areas and for homes; a social and economic plan which must form the basis for physical development; with appropriate legal and fiscal policies for the execution of the program.

The time for such planning is today;

and the difficulties and complexities of the problem need not deter a people like ours with three centuries of pioneering tradition in our blood. That the end sought is not an academic dream may be indicated by a recent contribution—on one phase of the problem—by the U. S. Chamber of Commerce under the title "Plan Now for Future Public works." This document points out that—

"In New England, the exercise of foresight would be termed 'Yankee shrewdness,' in the mountains of the South it would be 'gumption,' in the West 'horse sense.' Wherever found and whenever used, it is merely the application of good common sense in our affairs, personal and public, local and national.

"We all remember vividly the great depression which followed the roaring twenties. Men out of work, apples sold on the streets, bread lines, relief headquarters with interminable lines of applicants, poverty and destitution. It was not a pretty picture. We do not want to see it occur again.

"Good common sense should tell us that if we intend to avoid a repetition of this ugly picture, now is none too soon to do the real hard spade-work necessary for its avoidance. That means 'Postwar Planning.'"

We are all, probably, in favor of planning in some form or other; but when it comes to the question who is to do the planning, harmony dissolves into discord. Big business is all for planning, by big business—but not by government. Republicans are all for planning, by Republicans—but not by Democrats. Governors are all for planning, by the state—but not by the federal government. President Wriston of Brown University says in the August *Harper's* that "Government by bureaucracy, control of business by administrative regulation, manipulation of the economy for political purposes—

these are stark reaction." Representative Sumners of Texas, in the September *Reader's Digest* thinks we are on the road to Hitler totalitarianism, and his remedy is to "send all these non-federal functions back where they belong to the states and the local communities." Yet it is clearly impossible for business to plan with intelligence except in relation to governmental plans, or to prepare local and state programs except within the framework of a national plan, or to make any plan at all without "administrative regulations" and "manipulation of the economy for political purposes"—if we assume that the word "political" is used in its true meaning as "pertaining to polity, or politics, or the conduct of government . . . relating to the management of the affairs of state."

One of the most unfortunate examples of extreme opposition to the intelligent exercise of foresight was the action of our last Congress with regard to the report of the National Resources Planning Board. This report is recognized by all competent critics as a technically sound and philosophically illuminating document—far more significant for the United States than was the Beveridge Report for Great Britain. Yet the Beveridge report was an the counters of all the New York bookstores last December, while the National Resources Planning Board report has been—for the time being—smothered and ignored. Congress not only abolished the Planning Board, as a part of its private war against the administrative branch of the government, but provided specifically that no other agency of that government should continue any of the work of the Planning Board and that the records of the board should be kept in the archives and not made available to any other government agency.

The argument against planning by governmental agencies—the only agencies which can possibly plan in the

common interest of all of us—always follows the same general line. It relies on an emotional appeal against "bureaucracy" and an invocation of the sacred rights of the individual, which are supposed to be threatened by collective action. It ultimately stems from the doctrine of laissez-faire the mystical creed that if you let everything alone and everyone does as he pleases, some hidden god-in-the-machine will make everything come out well.

Yet it should be abundantly clear that there is no fundamental opposition between individual action and group action, that individualism is not always desirable and collectivism always undesirable. Our objective in a democratic society must, of course, always be the integrity and the welfare of the individual. It is equally certain that the welfare of the individual can often only be attained by collective action. In the field of housing and city planning, for example, it is clear that unregulated individual initiative has created our inflated urban land values, our ghastly slums and our decaying cities. The only possible way out is far-sighted and intelligent planning—not of boulevards and civic centers, primarily—but of communities, in which the individual can live and work and play and develop the fullness of his personality. The same need for planning is obvious in the social and economic spheres, where the individual needs the strength gained by collective action in order to attain the opportunity to work productively, to secure the medical care which has never been adequately provided for low income levels in the United States, to obtain a reasonable degree of protection against the unpredictable hazards of illness and old age—all of which desiderata are essential to the realization of that "dignity of the individual" of which we have talked so eloquently.

The problems involved are complex

ones. They must be decided by the people for themselves; but that decision must be made with the aid of expert advice. I suspect the most individualistic pioneer when he sought a path through the forest did not ignore the evidence of a trail made by some predecessor. Such a trail is a "plan" and the planner is essentially a trained and experienced trail-maker. This is why the indiscriminate abuse of "bureaucrats" is a particularly unfortunate manifestation of the effort to arouse irrational passions. Who are the "bureaucrats" of the United States? They are the hired men you and I employ to do some joint jobs for us. Is the postman who delivers your letters a "bureaucrat"? Is the traffic officer on the corner a "bureaucrat"? The chemist in the Department of Agriculture improving fertilizers; the physician in the U. S. Public Health Service controlling epidemic disease; the actuary administering the Social Security legislation passed by our Congress; even the harassed men and women engaged in the enforcement of essential wartime legislation; are these all "bureaucrats" because they happen to be hired by us to work for us, not by a private corporation to work for it?

The health officer is one of those dangerous "bureaucrats" who is striving with unselfish devotion for the common good; and one of the urgent

demands upon him in the future years will be for participation in the salvation and the upbuilding of the cities of this American continent. This is a task in which he must share—for the basic ideals involved in city planning are health ideals, if we think of health in its broader sense. It was not a planner or an architect who has given us our most vivid word-picture of the essential significance of the civic ideal. It was a great health officer, Sir George Newman, who said:

"What a strange and mysterious thing is a city! It is both a dream and a reality, a past and a present, the houses, workshops, and shrines of a commonwealth. It is the hearthstone of the people from which they measure the world. It is their dwelling place, the cradle of the living and the sepulcher of the dead, a home in the minds of men where their glory remains; an unseen army coming in through the Eastern portals of birth, an unseen army passing forth through the Horn Gate and Golden Gate and the gates of the West. It is the embodiment of the arts and crafts of man, the mart and market place of his merchandise, his rear guard from the enemy and his hiding place from the tempest, the beginning and end of the work of his hands. For men make cities, and cities make men; 'the walls of our cities are men.'"

The Evolving Pattern of Tomorrow's Health

III. The Health Department of the Future*

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THE preservation of public health has long been recognized as the first obligation of government. In the absence of health, man cannot survive.

Shed of the garb of superstition steeped in the fear and emotionalism of the miasmatic and epidemic constitution era, public health practice must now stand on its ability to provide people with the privileges of a long and healthful life which today's science and community health service can now provide. The dread of catastrophe with the approach of some devastating plague of unknown cause compelled people to place faith and authority in committees and boards of health. The healthmen have performed in noteworthy fashion in controlling epidemic disease and in sanitating man's environment. The pandemics of yesteryears are largely gone. The maintenance of communicable disease control services and supervision of water, milk, food, and excreta disposal can keep epidemics at a respectable distance. The modern health department must do more than reminisce on the visitation of smallpox, yellow fever, cholera, and the plague. It must contribute to the fulness and wholesomeness of a protected life.

The health department of the future must concern itself with the broader

interests of the masses. Education has dissipated the mysticism of medical practice concealed in a terminology of the classics. It has brought forth the realization that the eternal fight for good health is a people's struggle against ignorance, superstition, and poverty. The newer knowledge of the causes and modes of transmission of disease have dispelled the urge for the philosophic conjuration of the appointed few, and autocratic direction of the official healthman. Now the mother in the slums understands more fully than her sister on the broad boulevard the value of a safe milk and a sanitary food supply as a protection against the enteric diseases. The advantages of good medical care, of hospitals, diagnostic, x-ray, laboratory, and other technical services are now understood, and the urge to have them at the time of need is becoming universal. People are no longer satisfied with a barrier against the occasional epidemic; they seek the daily satisfactions of a vigorous and buoyant health. It is the healthman who has created these demands and appreciations. It is he who must see that the needs of the future are met on broad community bases.

Total health planning for the people of any area necessitates a complete knowledge of all groups and factors which contribute to better care both in health and sickness. Does the health officer consider community facilities in

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relation to his population, area, transportation, special needs, and the economic capacity of his people? Is the number of practising physicians, dentists, and nurses adequate to meet local need? What of the general hospitals, their character, standards of practice, availability of beds, costs of service? In what manner are adequate facilities and services provided for the indigent and part-pay patients? The benefits of good bedside nursing service have been broadcast without limit. Is such service now available to all who need it irrespective of their ability to meet the cost with family funds? And what of the clinical and public health laboratories? Are they licensed or controlled with a view of assuring good quality of service? Are blood counts, urine analyses, basal metabolisms, x-ray examinations within the price range of the many or available only to the few? Are the services of the competent pathologist and roentgenologist provided for expert and understanding interpretation of results? How long does it take to secure the examination of a sample of water or milk? Is blood plasma making its contribution to civilian defense? Does the community possess its own blood plasma reserves, in hospitals or state-wide pools, from which local physicians may obtain free plasma for treatment of patients in their charge? What types of medical and dental services for indigent and low-income groups are available in the health area? How are drugs, appliances, glasses, dentures secured? These and many similar questions must be answered by the health officer before he can proceed to a definition of his problems, problems based upon mortality and morbidity statistics, and an analysis of available service records by area, racial and social groups.

In dealing with the communicable diseases including tuberculosis, syphilis, and gonorrhea, the public health ad-

ministrator has not restricted his activities to statistics and health education. He has dealt with diagnostic facilities, consultation service, x-rays, laboratory service, tuberculin testing, blood examinations. He has been concerned with the adequacy of medical and nursing care, in sanatoria and hospitals, in clinics, and at home. Prompt and adequate care is essential to patient recovery, rehabilitation, and the control of infection. The health officer will extend his interests beyond the realm of the communicable diseases and plan community-wide programs to deal with other causes of disability—the problems of the adult, the aged, the industrially employed, accidents in the home, at work, and elsewhere. To what extent are those employed by tax supported agencies, by industry or commerce, or by other organized groups provided with hospital, surgical and medical care on an insurance basis? To what degree are industrial hygiene services available in the health area? What of plant sanitation, water supply, waste disposal, safety and wholesomeness of food served? What are the major industrial health problems and what is done about them? These and many similar questions must be answered by the health officer in evaluating the completeness of his community program.

The modern health department must assure to all the people the advantages of freedom from lingering illness and early death. We know a great deal about the character and manner of handling most diseases. We are wanting in the machinery with which to make medical, dental, nursing, and other public health services readily available to the masses. It does not follow that the health officer should of necessity administer all the functions and activities which we have enumerated. As a rule he will not. These services will not all be a part of the

health department fabric. The form of organization will vary with time and place. It is, however, essential that the health administrator become a leader in the planning and a coordinator in the fulfillment of such programs even though they be not under his direct administrative supervision. Should he fail to become a leader in a new health era of tomorrow, others less competent stand ready to act in his stead.

There has been much waste of personnel, time, and material, in the name of public health. In the days of inexact and partial knowledge of the causative factors of disease spread, there was some excuse for this waste. But even today many health departments emphasize the esthetic and the politic at the expense of the fundamental principles of health promotion. In the emotional and terrifying days of yellow fever, cholera, and other exotic diseases, the judgment of the health committee was seldom challenged. Any expenditure of public funds or any imposition on personal liberty seemed justified as a public health measure. Today with a more common understanding of disease control and prevention the board of health must give full and reasonable accounting for all of its costs and expenditures. To do otherwise means loss of public confidence and willingness to support the work of the health department. Appropriations would shrivel up and soon disappear if the people did not give understanding approval to the health program. We can find comfort and aid in our own *Evaluation Schedule* for local health services initiated by the Committee on Administrative Practice in 1921, repeatedly revised and adjusted during the past twenty years and kept attuned to the ever-changing concept of health needs, and now streamlined to meet the social, health, and welfare problems of the future. Together with the new *Evaluation Schedule* there is now being pub-

lished a *Guide* to serve as an administrative handbook. There has also been published a booklet known as *Health Practice Indices*, consisting of a series of charts showing the range of unit practice for cities and counties which have submitted schedules for the past two years. It is believed that this pamphlet will serve a most useful reference purpose to health officers as it will depict practices in various parts of the country. These three publications constitute the measuring rods with which the health officer may study his own work and accomplishments in relation to the work of others and in terms of group judgment as expressed by the members of the Committee on Administrative Practice.

Our existing trained personnel of physicians, dentists, public health engineers, nurses, and others who have prepared for a professional career in our field of life conservation have not been effectively employed to secure complete and adequate coverage throughout the states. Until the release of the report of the Subcommittee on Local Health Units no master plan had been prepared for the extension of full-time local health service to all parts of the United States. This committee has shown that there are 41,052,600 persons in 1,687 counties in 41 states for whom no full-time health service has been provided, while in the remaining counties, cities, and districts there is frequently found duplication of effort by political units. It is now believed that 1,127 local units administered by a professionally trained and experienced health officer, preferably a physician with appropriate associated professional and technical personnel and equipment, can provide the quality and quantity of health service suggested in the *Evaluation Schedule* and its accompanying *Guide*. As a rule (and we admit an occasional exception to any man-made rule) population units of less

than 50,000 are not able to obtain and support well qualified personnel, and find it difficult to support a full-time local health unit. A balanced program demands an adequacy of trained personnel in addition to the medical officer of health. Minimum ratios have been suggested for public health nurses (one to each 5,000 population), public health engineers and environmental sanitarians (one to 25,000 population), clerical personnel (one to 15,000 population). The committee has under consideration the need for health educators, statisticians, and laboratorians.

The committee's proposals do not, however, end here. They include economic and professional service factors. It is stated that:

... in developing district outlines an endeavor should be made so to group counties or parts of counties as to reduce large inequalities in per capita income by combining urban and rural, high and low income groups in a single jurisdiction where otherwise desirable. Also, in combining counties or parts of counties within one district an attempt should be made to group them so that the ratio of physicians will not be less than 1 to 1,500 of the population, and that the general hospital beds available for the community be not less than 3 per 1,000 of the population.

All these recommendations suggest new responsibilities for the public health administrator. Neither self imposed isolation in the seclusion and comfort of a city hall chair nor complacent meditation on the occasional epidemic and abatement of nuisances offensive to the olfactory nerve will produce the type of community-wide understanding and coöperation so essential to the fulfillment of the health program. The health officer must become a leader among the professional and lay interests of his city, county, or district. He must elevate his office and influence from the era of the garbage dump and pesthouse to leadership in education and in the social, health, and welfare services. Health education is

the foundation upon which all public health practices survive. And there is no need of giving the public the newer knowledge essential to health promotion unless we provide the facilities to make the services universally available. There is no need to excite people about the ravages of syphilis or the devastating influence of tuberculosis unless we prepare and establish the facilities through which the individual may receive the benefits which are his due. Why sing the praises of penicillin, the sulfa drugs, or blood plasma if these are not within the financial reach of the individual? Every new health promoting and lifesaving activity should be available to all alike, as rapidly as such developments are scientifically approved and commercially practical. To teach people what they should have for sickness and health, be it food or medicine, and then fail administratively to make accomplishment possible results in frustration, disappointment, and social unrest.

For the public health of the future we need democratic planning and participation rather than autocratic dictation by government or vested interests or fortified minorities. The newer knowledge of the medical sciences is making available a great host of lifesaving drugs, sera, preventive and protective treatments. The discovery and use of many of these substances has been stimulated by the war. New problems in distant lands, the want of therapeutic preparations of prewar days have prompted the development of new and substitute means of handling disease and promoting health. Their value will be well known to the returning members of the armed forces. Demand for their use will be universal. Programs for community health service must include all these implements for warfare against disease. It means better health departments, better medical and dental services, hospitalization

when indicated, the means of early diagnosis, laboratories, x-ray services—all within the means of every one of us. The health officer of yesterday must

unshackle himself from the dogmas and heritage of his predecessor and become a leader of the new public health of tomorrow.

Maternal Mortality in New York State: 1933-1942

... Ten years ago the New York Academy of Medicine published the findings of its Committee on Public Health Relations based on a study of more than two thousand deaths from diseases and conditions associated with childbirth.* In introducing this courageous report, the Committee observed that "the spectacular progress of the last years in the reductions of many death rates has not been paralleled by any drop in the rate of death from puerperal causes." Its unequivocal conclusion was that as a conservative estimate almost two-thirds of the deaths were preventable, "that number of women, if they had had proper treatment and care, could and should have been brought safely through parturition." The responsibility was divided by the Committee in an almost 2 to 1 ratio between the attending physicians and patients: the physicians were charged in equal numbers with error of judgment or error in technique; the patients, with failure to obtain suitable care (59 per cent), or lack of co-operation (41 per cent).

The disclosures made by this distinguished body of specialists, their concrete recommendations, the probing activities by other medical groups throughout the State, which brought about radical changes in obstetrical practice and hospital procedures, and the coincident developments in chemotherapy have produced astonishing results. Now the sentence quoted above may be justly inverted: "the spectacular progress of the last years in the reduction of the death rate from puerperal causes has not been paralleled by the drop in the rates of death from most of the other important causes." The Committee considered that it should have been possible to prevent 65.8 per cent of the maternal deaths. In 1933 the New York State rate was 63 per 10,000 live and still births; in 1942 the rate was 22, a reduction of 65.1 per cent! This almost perfect correspondence between scientific hypothesis and actuality, while striking, would be unimportant did not the present favorable condition represent a stage in an uninterrupted downward trend.—From *Health News* (New York State Dept. of Health), 20, 42 (Oct. 18), 1943.

* *Maternal Mortality in New York City*. The Commonwealth Fund. New York, 1933.

The Evolving Pattern of Tomorrow's Health

IV. The Health Worker of the Future*

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THE other day a well known commentator on current affairs who was predicting the pattern of post-war America went out of his way to assure his readers that the quality and quantity of public health services were sure to be expanded and increased. Such an idea probably never occurred to the commentators who were forecasting the brave new world a generation ago, and indeed the fact that anyone may so predict with confidence now throws light on what has happened in the last quarter century. Commentators may now have before them forecasts like Dr. Vaughan's of the health department of the future around which to imagine the reality of community health.

The health worker who was preparing himself for career service in public health 25 years ago had a difficult task because, for one thing, the classes of public health workers were not sharply defined, their titles and functions had not become at all uniform, and there was slight tendency through the development of merit systems and other devices to bring these functions down to a common level in the various parts of the country. In short, the progress

toward making public health a profession had just begun, and it has been allowed to grow since without much conscious planning.

To those who have grown up into careers in public health during this quarter century these facts are familiar, yet it probably is well for us to remind ourselves of such significant changes as we try to look ahead to the post-war period and to forecast something of the character of the health worker of the future and his place in the community. We shall assume that his undergraduate training will continue to improve; we shall concern ourselves with graduate levels of training and experience.

This effort to sketch a composite picture was suggested by the Program Committee in planning the 72nd Annual Meeting, and William P. Shepard, M.D., Chairman of the Committee on Professional Education, was chosen as the person best able to look ahead. Dr. Shepard's inability himself to be present need not prevent his contribution to the thought and planning which are here reflected, for it is in this field that his committee has been laying a foundation. The work of the Committee on Professional Education now represents 13 years of consistent study and planning on the part of a specially selected group who have sought to make a true forecast of the health worker that

* Presented at a Special Session of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 14, 1943.

is to be. This committee was organized under the Chairmanship of W. S. Leathers, M.D., who, four years ago, was succeeded by Dr. Shepard.

We may today think of at least 22 specialties comprehended within the framework of public health. Besides the better recognized classes, such as health officers, public health engineers, sanitarians, public health nurses, laboratory directors, vital statisticians, industrial hygienists, nutrition workers, maternal and child health workers, epidemiologists, and school health men, one may list the public health dentist, the food chemist, the serologist, the pathologist, the bacteriologist, the medical specialist in tuberculosis, syphilis and gonorrhea, the medical administrator, the executive of voluntary health agencies, and perhaps a dozen other specialties which have grown up during the rapid development of professional work.

You have heard Dr. Vaughan say that the modern health department must do more than reminisce on the visitation of smallpox, yellow fever, cholera, and the plague. It must contribute to the fullness and wholesomeness of a protected life. Fortunately Dr. Vaughan is a member of the Committee on Professional Education, through which the Association is helping to prepare the human material upon which his plans for better health departments must directly depend. It is appropriate therefore for this forecast to be read in connection with Dr. Vaughan's brilliant paper on the task which the health worker will have to perform.

QUALITIES OF THE PERSON HIMSELF

This forecast assumes that the person himself will possess qualities which enable him to be above the average in capacities which we all recognize as useful to career men and women. I am impressed that knowledge of public administration and of public law will give

any health worker an advantage as he builds a career. There are, of course, other universally recognized subjects of importance. Especially will he do well to possess information about good personnel administration, whether he be employer or employee. We can expect the significant advances here of which business has already availed itself to be used in public service as well. The career healthman needs the fundamental information usually comprehended in systematic courses, but he also needs training and experience in the use of these tools in real life so that, in Browning's phrase, he will "watch the master work . . . and catch hints of the proper craft, tricks of the tool's true play."

What an advantage any person has who possesses public speaking ability, with poise before an audience and the ability to use his voice effectively. Similar ability in writing will represent perhaps an even more important resource for the health worker of the future than today. These skills may be acquired like others. It is encouraging to see the recognition of these values among the schools of public health. One school has set itself to make a recording of the voice and the public address of each student as a base line from which improvement may be expected. Another proposes to make good attainment in English composition a requirement. All of this will tend to make the healthman a more outgoing person, better able to transmit to others the knowledge and the attitudes which he possesses, and more persuasive in his approach. He must be more articulate. Is it not regrettable that our professional courses today tend to squeeze out of the trainee all the extroversion that he may have possessed? It results in the present difficulty to find even a few good public spokesmen among professional persons for radio programs of national scope. Yet I be-

lieve that the native endowment of public health workers in such ability is probably equal to that of those going into law or the ministry. The value of these accomplishments needs to be recognized and encouraged in our formal curricula so that the candidate will be both well informed and a real person. And we must encourage better performance, preferably by good example.

The inquisitive mind is another possession which we should like our public health worker of the future to possess, and we hope that he will carry on with such an attitude after his formal courses and into his daily life. Post-graduate training, in-service training, and refresher courses will mean much more to him and to those he serves if such a youthful freshness of viewpoint can be maintained and encouraged by the framework which we create for his employment.

IMPORTANT FOUNDATION STONES FOR A CAREER

Among several subjects which the worker of the future should understand I would like to emphasize a familiarity with social welfare and the economics of health. He should be conversant with the problems of public medical care and will probably more nearly accept than his colleagues of today the philosophy which the Association has declared in its official memorandum on "Desirable Minimum Functions and Organization Principles for Health Activities."¹ The teaching institutions must lead the way and prepare the student to expect a better pattern than that of the status quo.

It seems likely that the formal curricula for those preparing for life service in our field should be planned and operated by the universities, and that governmental supervision should not be expected to reduce these to a single denominator. We shall not soon be ready for rigid uniformity in this re-

spect, yet there is a need already apparent for certain standards in the training of students, and the memorandum recently published by the Committee on Professional Education represents a declaration which forecasts some desirable minima which may by reference be included here.² The time is here, however, when the trainee has a right to know whether the school which he selects meets reasonable standards in its equipment and personnel. It is my belief that a listing of acceptable courses in public health is a need which now should be met and that the proper agency to list courses, outside of those in public health nursing, is the A.P.H.A.

There will follow a need for recognition of the attainment of the worker himself. There may be need for some certification beyond that afforded by Fellowship in the American Public Health Association and by the specialty diplomas now in use. It is my opinion, however, that the solution does not lie in an extension into public health specialties of the specialty board system which has grown so rapidly during the last decade in medicine.

PATTERN OF PUBLIC EMPLOYMENT

What may the worker of the future expect that pattern of his public employment to be? I believe that he can expect an expanding demand for this service and a readiness on the part of the public to pay salaries more nearly equal to those of his peers in his own profession and that of teaching. Certainly he can expect further progress to be made toward public service as a public trust, the trend toward which is already discernible in some political units. The recent amendments to the Social Security Act in the United States have given a substantial momentum to these changes and, if they are wisely administered both nationally and locally, it seems possible by this means to do away with the spoils system as it still

involves some health departments. Let no one underestimate the difficulty of this achievement, yet the way has been shown in some outstanding agencies and the future does belong to those who succeed in making public health a career service with at least as much independence as public education now possesses. Of basic importance to this end is the attitude of the public health professions toward the merit system, and at this critical point the American Public Health Association proposes to help make merit systems better and to create among the public health professions a sound appreciation of their significance.

Public merit systems, operated as a part of modern personnel management, seem to be clearly in sight. The good effect of such progress can hardly be measured on the attractiveness of professional work under public auspices, for the climate can be changed for the better and public employment may well attract and challenge the best personalities of the oncoming generations. It will take time to remove the incubus of old fashioned civil service systems which have bogged down with accumulated routines not at all acceptable to well trained career persons. The concept of civil service as a room, with a heavily guarded entrance and a barricaded exit, and with nothing between, represents an outmoded pattern. With an up-to-date recruiting system, with good job classification, with modern, objective examination methods, with personal service ratings, in-service training, a good salary system, supervised promotion, and with workable methods of separation from the service, the health worker of the future can well expect to live in a climate where the best he has to give may be given under circumstances that encourage career service. The Association hopes that such an achievement may be reached through coöperative planning between

its Committees on Administrative Practice and Professional Education. The latter committee now has a staff at work productively along these lines.

A PROGRESS REPORT

Such a statement of ideals for the future requires that we orient ourselves as to the progress already made toward these goals. The 13 years of the Committee on Professional Education have resulted in the formulation of eleven statements regularly adopted by the Association, covering the educational and experience qualifications of as many specialties. In addition, four reports are in various stages of completeness as they progress through a regularly established routine of the Committee on Professional Education. Within another year it is not too much to hope that the Association will have reports available covering the best present opinion on training and experience on practically all the specialties represented in public health. A well planned scheme of periodic revision will serve to keep these statements fresh and abreast of the best thought as the years pass. The present circulation of reprinted reports has now exceeded 16,000. Thus the high aims of the founders of the Committee on Professional Education approach fulfillment and the worker of the future will owe much to these formulations of the most reliable opinion available. They are not static formulations, neither are they laws, but their influence is extending daily, and already they have been reflected in the qualifications required in scores of state and local jurisdictions and, with the progress of the Merit System Unit, it will not be long until they will have a really profound effect on professional levels throughout the United States and its possessions.

There is no intent on the part of the Association to ignore the voluntary agency and its staff in these considera-

tions which, for good reason, are focused largely on the official agency. There will probably continue to be many such privately employed persons. We shall hope to have a much more adequate forecast of what voluntary health work of the future will be like when the report now in preparation by the National Health Council is published. Even now, however, the Committee on Professional Education has reports in process or approved which relate directly to these unofficial activities. After all, a specialist—shall we say in tuberculosis—needs a background much the same whether he shall serve this year in a public agency or next year with a private group.

In the early stages of the development of professional standards it is inevitable that there should be rather sweeping exceptions allowed on account of those who had attained more or less standing before the movement upward got under way. Just as in the standards for admission to medical practice there had to be a "grandfather clause" to take care of those who had enjoyed years of practice before the rules came into effect, so it has been necessary in public health specialties to make similar provisions. The day is coming, however, when the passing of time will make such exceptions needless, and the occasion for recognizing unprepared persons appointed for political or personal reasons will become rare. The net effect of this progress on career service in public health will be good and far reaching.

The stimulating experience which has come to universities and to hospital staffs through the exchange of visiting experts should now be arranged by staffs of health departments and of other agencies. Why should not a plan for the loan and exchange of valuable staff educators, for instance, between university departments of nursing and visiting nurse associations, be now

within reach? A comprehensive plan for field training centers open to those who complete the academic courses is imperative. If these can be set up co-operatively between several universities and local health agencies they will have an even greater usefulness. Such cross-fertilization as in these exchanges and in coöperative field training can make the service of the health worker of the future a stimulating and delightful experience that can stand in contrast with deadly routine which so easily develops where imagination and freshness are lacking. This plan can readily be worked in with present plans for study leaves, and can push forward the average of staff understanding and performance without waiting for another generation to arrive.

RECOMMENDED ACTION

This attempt to sketch a composite picture of the health worker of the future assumes that the teamwork which at best now characterizes some official and some private agencies will be attained elsewhere. Patterns of action which reflect this teamwork between federal and state agencies and between official and nonofficial may be cited. The present method of lend-lease personnel by the U. S. Public Health Service, together with in-service courses, has done something to promote higher standards everywhere. The present coöperation between the federal and state official agencies and the Merit System Unit of the A.P.H.A. makes it possible soon to expect the day when good methods of personnel administration will be available in every state. There are hopeful signs that the person trained and experienced in one section of North America may be useful and available for other areas through common registers. The preparation by the professional society of standard reports on communicable disease control, on the examination of water and

sewage (in coöperation with other agencies), on dairy products, and on diagnostic procedures—are serving a useful purpose in raising levels of work and eliminating meaningless differences. Thus blind alleys in professional advancement can be obliterated and ability can be better recognized wherever it may appear.

We have said that the developments of the last quarter century have been important but largely unguided. What may we do now to make career positions more attractive and more productive after another 25 years? What can a professional society do to guide the developments of the future?

We certainly should encourage the systematic training of those persons who have proved themselves to have ability. I believe the future will approve an apprentice system of testing trainees before postgraduate courses.

We should create a desire among health workers as among the public for modern personnel management, including merit systems.

We must encourage the better students in our undergraduate levels to seek careers in public health.

We must set before the oncoming generation good examples of public service which in turn will make profound differences in the health of our grandchildren.

We must make the public aware that in this field we are in competition economically with careers that offer good money returns and that, in the long run, there is no sound economy in low salaries and all that they bring.

I believe that Dr. Shepard and his committee have laid a durable founda-

tion for the professional worker of the future and that the pattern for 1968 can be discerned in what we have now at our best.

The post-war world is going to need public health more than ever before. We have a growing tradition here that can be of high value for North America and perhaps good enough and strong enough to share with the rest of the world.

At any rate we may be sure that careers in public health founded on public service as a motive will bring that prestige which we seek for the healthman of the future and that there is no other way. Then advancement and recognition will properly come to those who have given most liberally of themselves to others.

"Oh if we draw a circle premature,
Heedless of far gain,
Greedy for quick returns of profit, Sure
Bad is our bargain!"

Dr. Vaughan has said that the health worker of yesterday must unshackle himself from the dogmas and heritage of his predecessors and become a leader of the new public health of tomorrow. Somehow I have confidence that through the American Public Health Association we are accelerating this process.

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The final paper on The Evolving Pattern of Tomorrow's Health, by Felix Hurtado, M.D., will appear in an early issue of the JOURNAL.

Function of the Health Officer in the Control of Tuberculosis among Veterans*

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ON previous occasions, I have pointed out that the tuberculosis problem in the United States is on the way to solution, and although war conditions may cause a setback, this may be expected to be only temporary. There are, however, a number of difficulties which must be overcome before our tuberculosis problem is finally resolved. For example, there is still a heavy concentration of the disease among Negroes, Mexicans, and Indians. Less serious, but nevertheless troublesome, is the high incidence of tuberculosis in certain occupations. Today, I wish to call your attention to a third situation, namely, tuberculosis among the veterans of our armed forces. In our campaign to eradicate the disease, this constitutes a hurdle whose magnitude and insidiousness have not been sufficiently appreciated. I am sure that health officers will wish to know the facts and will be eager to deal with this difficulty, as well as with the other two which I have mentioned. Their help is particularly needed in creating a new setup for the veterans, now that we are involved in the greatest war in our history, with larger numbers of our own men and women in the armed forces than ever before.

Let us review the development of the tuberculosis problem among veterans and what has been done to meet it. During the first World War, knowledge and facilities for the diagnosis of tuberculosis were inadequate to screen out at induction many of the men who were suffering from the disease, particularly in the early stages before symptoms appeared. This fact resulted in the later discovery of many active cases in the Army; the hardships incidental to the training program and to war duties produced still more. After the war, care of these tuberculous veterans was entrusted to the newly organized Veterans' Bureau. Many hospitals and sanatoria were erected for their treatment, and this service became a major medical activity of the bureau, and of its successor, the Veterans' Administration. As early as 1923, there were 23,653 veterans with tuberculosis admitted for treatment in hospitals or other agencies supported by the bureau. At first, such care was limited to those whose tuberculosis was connected with their military service; but subsequently more generous provision was made, so that those whose disease was unrelated to their military service (non-service-connected disability) also became eligible for treatment. As a result, the number of admissions for tuberculosis has continued large. As recently as the fiscal year 1942, after almost a quarter

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century, the total hospital admissions for the year numbered 9,658. For the entire period since the last war, there have been over 300,000 admissions of tuberculous veterans to hospitals of the Veterans' Administration or to other government, state, or civil institutions. However, as we shall see later, these admissions do not correspond to that many different patients.

The government has been most generous in meeting its obligation to tuberculous veterans. There has been an extraordinary expansion in the physical facilities for treatment. No efforts or funds have been spared in erecting hospitals of the latest type with excellent equipment, and with as good medical personnel as could be obtained. In March, 1942, there were 5,217 beds in operation to meet current needs, including those of veterans of the present war. This figure includes beds for the tuberculous in veterans' psychiatric hospitals. The number of beds for these purposes has naturally declined, as tuberculous admissions have become fewer. In addition to having all the costs of their hospitalization and transportation to the hospital paid for by the government, tuberculous veterans also receive a disability payment. Those with service-connected disability resulting from active pulmonary tuberculosis receive from \$70 to \$100 per month, depending upon the degree of disability. Those with non-service-connected disability receive \$40 per month, if totally and permanently disabled. However, those without dependents receive a much smaller payment during hospitalization—\$20 in service-connected cases and \$8 in non-service-connected cases. For men who are treated at home, there is available an additional payment of \$50 per month to the wife or other person attending the patient. I should point out here that these financial arrangements have had the unfortunate effect of providing

an incentive to many men to discontinue hospital treatment and to attempt a cure at home.

The standards of operation in veterans' hospitals are of a high order, as is indicated by the ample sums set aside for cost of treatment. Thus, in 1942, excluding overhead costs, the per diem cost of operation for the tuberculosis hospitals of the Veterans' Administration was \$4.37 per patient. This has brought the total direct costs of treatment during 1942 to about \$8,000,000. Payments to veterans with either partial or total disability due to tuberculosis, whether or not service-connected, amounted to approximately \$40,000,000 during the fiscal year 1942. It is notable that the number of such cases for World War I still numbered 63,000 in 1942. The great majority of such persons are receiving pensions for permanent partial disability. The number receiving disability payments is many times that receiving treatment in hospitals. The amount paid in disability claims over the last twenty-five years is in the neighborhood of a billion dollars. In addition, there have been substantial payments to dependents of tuberculous veterans who have died.

In spite of the extraordinary development of the services for tuberculous veterans, the experience of the veterans' hospitals has been unfavorable. Thus, in 1942, of the 9,854 cases discharged from these hospitals, only 1.9 per cent were designated "arrested" at discharge; only 0.3 per cent "apparently arrested," and only 0.8 per cent "quiescent." If we combine these three categories, the fact emerges that only 3 per cent of the patients discharged during the year were medically rehabilitated. The remainder of the cases were discharged as "condition improved" 32.7 per cent; "condition unimproved" 28.9 per cent; "dead" 19.5 per cent; and "condition not

stated "16.0 per cent. It is clear that the vast majority of the patients discharged were not yet ready to be released to civilian life. The so-called "improved" cases represent, for the most part, patients with unstable lesions. As a matter of fact, a very large proportion of them left without authorization or consent. Thus, the Veterans' Administration itself classified the hospitalization of 58 per cent of the cases as "incomplete." The 1942 figures on condition at discharge from the Veterans' hospitals are rather typical, somewhat worse but not greatly different from those of earlier years. At no time since 1929, when the present type of report of the Veterans' Administration began, has the total for the "arrested," "apparently arrested," and "quiescent" reached 6 per cent.

Admittedly, one cannot make exact comparisons among various sanatoria as to results of treatment on the basis of crude figures of this type. This is particularly true now, for with the passage of the years, the usual case admitted to the veterans' hospitals is of the chronic type common among middle aged and older persons. Thus, of recent admissions, only 4 per cent were "incipient" cases, 22 per cent were "moderately advanced," and 74 per cent were "far advanced." With all due allowance for this fact, there is a painful contrast between these recent figures (as well as those of earlier years) and the results obtained in well managed state, municipal, and private sanatoria. Thus, in a country-wide survey of tuberculosis hospitals and sanatoria in the United States during 1933-1934, made by the American Medical Association; patients with tuberculosis "arrested," "apparently arrested," or "quiescent" on discharge, accounted for 29 per cent of the total discharged. A survey of discharges from the Michigan State sanatoria from 1930 to 1934 also showed a high proportion of

cases in these three categories—61 per cent of the total discharged. The experience of the Mount McGregor Sanatorium of the Metropolitan Life Insurance Company for males discharged between 1919 and 1936, and *excluding incipient cases*, showed that 48 per cent, or practically half of the cases, were "arrested," "apparently arrested," or "quiescent" on discharge; and even for the cases far advanced on admission, this proportion was 34 per cent.

There are clear reasons why this deplorable situation among tuberculous veterans has developed. The failure is not due to lack of desire to help these men. It was certainly the aim of everyone connected with the service to do as much as possible for them. The chief difficulty was lack of appreciation on the part of legislators and others interested in veteran welfare, of certain fundamental conditions necessary for the effective treatment of tuberculous patients. In part, outside pressure was brought to bear to liberalize financial provisions for these veterans. The effect of these measures has been to reduce control over the movement of tuberculous patients to a minimum. The veterans are not subject to the usual type of hospital restrictions, but may come and go almost at will, irrespective of their condition and against medical advice. There are cases on record where veterans with tuberculosis have left and then been readmitted as many as 24 different times. Six to 8 admissions of the same patient are a common occurrence in spite of much effort on the part of Administration officials to educate and persuade patients to stay in hospitals until completion of treatment, and in spite of certain measures to control offenders through exclusion from re-hospitalization for certain periods. The type of discipline that is so essential to success in the care and treatment of the tuberculous patient is lacking, for the most

part, in veterans' hospitals. Indeed, the laws and practices relating to these veterans have so developed that it is often financially advantageous for the patient to leave or to stay away from the hospital altogether. This, of course, is an impossible situation. It has served to undermine the morale both of the tuberculous veterans themselves and of the doctors and other members of the professional staffs serving them.

But the situation in the veterans' hospitals has had results which most health officers will consider more serious even than failure to rehabilitate men already suffering from the disease. The discharge of men before they are cured has left its toll on the entire country. It has allowed thousands of veterans with active tuberculosis to return to civilian communities each year. It has made it possible for fairly large numbers of open cases to live at home, under little or no medical supervision. These men have traditionally been looked upon as wards of the federal government and consequently the state and local health officers have taken little responsibility for them. Actually, however, the control of the Veterans' Administration over these men has been rather loose. Few of the patients have gotten well; the great majority have constituted an army of discouraged men who have become centers of infection for new cases of tuberculosis in the communities to which they have returned after treatment in the veterans' hospitals.

The authorities in the Veterans' Administration, as well as leaders in veterans' affairs, have become aroused to the need of correcting this whole situation. It will not be any easy task because it involves a rather complete change in viewpoint, and it touches what may be called a "vested interest" in certain benefits. Consideration is now being given to specific

methods of improving matters, and, in due course, the necessary legislative measures will come up for consideration. In an effort to get tuberculous veterans to resume sanatorium treatment and stay until satisfactory results are obtained, the American Legion is launching a campaign to have each local branch do the necessary missionary work among members in its own locality and to see that the veterans continue hospital treatment until discharge by the doctor.

As health officers, you can help in many ways. First of all, you can bring pressure to bear for revision of the generous but ill-advised legislation that has been in part responsible for present conditions. The current laws are altogether too loose in their benefits to veterans. There must be new controls to make these benefits not only liberal but medically effective. Legislation must discourage the uncontrolled movement of tuberculous veterans until the disease is "arrested" or at least until it is not a community menace, just as the movement of psychiatric veterans is supervised and curtailed.

Second, you can coöperate with the Veterans' Administration in the follow-up of tuberculous patients who have left veterans' hospitals. The Veterans' Administration has indicated that it will release such information to state and local health officers, and routine procedures for getting such reports should be set up without delay. It will be the responsibility of your departments to make available locally the necessary social and medical services for those tuberculous veterans who are unwilling to use the federal facilities. If these men are still in need of sanatorium care, they should be hospitalized either in state or local sanatoria. Whenever it seems necessary to invoke your legal power to enforce compulsory hospitalization or isolation, you must do so.

Apart from this, I would suggest that each of you investigate independently the facts with reference to tuberculous veterans in your own state or community. A canvass and follow-up of the list of those who are reported to have tuberculosis would probably show many such cases in your jurisdictions. As I have indicated, most of them are middle aged men, many of them centers of infection and chronic offenders against all reasonable hygienic precautions. Because of their status as veterans and their habituation to the loose hospital discipline which I have mentioned, they feel privileged to do pretty much as they please. These men should be sought out and cared for, and, if necessary, isolated for the protection of their families and their neighbors. I am convinced that this situation in your local communities constitutes one of the most serious difficulties in the national effort to eradicate tuberculosis.

Frankly, I do not know how much we shall be able to accomplish with the old veterans. But I feel that a genuine and earnest effort must be made to protect the new and large crop of tuberculous veterans who will inevitably emerge from the present war. As early as the beginning of July, 1942, their number had already exceeded 800. By this time, the war's tuberculosis victims are probably counted in thousands. From present indications, there is danger that the Veterans' Administration may be compelled to function under the same regulations and procedures which govern the care of veterans of World War I. There is already evidence that all is not well with the new tuberculosis victims, and that they are showing the same restlessness, the same abandonment of regular hospital care, which has produced such calamitous results among the older men. The stage may be set for another great medical tragedy; and unless we take action, I believe that

lack of discipline and mistaken generosity may not only take their toll of these young men—who should by all reason get well and be sent back to their communities to take up a useful life again—but may also seriously delay our control of tuberculosis in the general population of the country.

But we can avoid such a situation. I am calling these difficulties to your attention because they can be met and rectified right now, if we all work together toward a sensible program at the start. The present situation is far more favorable than it was during the last war. We have at our disposal excellent medical facilities and improved skills in treatment. The new crop of tuberculous veterans is more apt to be in the early stage of the disease, when cure or arrest is most rapid and sure. The Veterans' Administration and the American Legion are both aware of the seriousness of the situation and are eager to coöperate with the state and local health officer in any plan to help veterans to be cured and to protect the families of the men from infection. Working toward the same objectives, you health officers, together with these two organizations and with a public and government both increasingly aware of their responsibilities toward the veterans of this war, should be able to bring about really constructive action. Through such an outlook and such teamwork, the young tuberculous veterans should benefit by every medical facility and enlightened service we can offer. There is every reason why a large proportion of them should return to their homes as productive citizens, rehabilitated medically and industrially. As health officers, you have an extraordinary opportunity to contribute to this program, and to shape the future of these veterans, as well as of the tuberculosis movement all over the country.

Public Health Degrees and Certificates Granted in the United States and Canada During the Academic Year 1942-1943*

THE Committee on Professional Education of the American Public Health Association presents a report of public health degrees and certificates granted in the academic year 1942-1943. With the exception of public health nursing tables, the committee has included only graduate students enrolled in courses leading to graduate degrees and certificates. The basis for the record is *the number of students who received degrees* rather than the number of degrees granted in the specified period.

Graduate Students Enrolled and Degrees Granted in Public Health Engineering and Sanitary Engineering Courses in the Academic Year 1942-1943

TABLE 1

| <i>Name of University</i> | <i>Number of Graduate Students Registered</i> | <i>Graduate Degrees Offered</i> | <i>Number of Students Receiving Each Degree</i> |
|---|---|--|---|
| Agricultural & Mechanical College of Texas | 4 | Ph.D. M.S. | 0 1 |
| Cornell University | 0 | None | 0 |
| Harvard University | 12 ¹ | Sc.D. M.S. | 1 8 |
| Iowa State College | 1 | None | 0 |
| Johns Hopkins University | 3 | Dr.Eng. M.P.H. M.C.E. | 1 1 0 |
| Massachusetts Institute of Technology | 1 | Ph.D. Dr.P.H. Sc.D. S.M. | 0 0 0 1 |
| New York University | 11 ² | Dr.Eng.Sc. M.C.E. | 0 3 |
| Pennsylvania State College | 0 | Ph.D. M.S. | 0 0 |
| Rutgers University | 0 | Ph.D. M.Sc. M.A. | 0 0 0 |
| Stanford University | 2 | Eng. in C.E.: San. M.A. in C.E.: San. | 2 0 |

¹ In addition 11 students taking a 3 month course not leading to a degree

² Part-time students enrolled for graduate degrees

* For previous reports see *A.J.P.H.*, Vol. 32, p. 1360; Vol. 31, p. 1306; Vol. 30, p. 1456; Vol. 29, p. 1338; Vol. 28, p. 863; Vol. 27, p. 1267; Vol. 26, p. 819; Vol. 25, p. 341; Vol. 23, p. 1124.

TABLE 1 (Cont.)

| <i>Name of University</i> | <i>Number of Graduate Students Registered</i> | <i>Graduate Degrees Offered</i> | <i>Number of Students Receiving Each Degree</i> |
|------------------------------|---|---|---|
| University of Alabama | 0 | M.S. in P.H.E. M.S. in S.E. | 0 0 |
| University of California | 0 | M.S. | 0 |
| University of Illinois | 0 | Ph.D. (San. Eng.) M.S. (San. Eng.) | 0 0 |
| University of Iowa | 0 | Ph.D. M.S. | 0 0 |
| University of Kansas | 0 | M.S. | 0 |
| University of Michigan | 8 | M.P.H. M.S.P.H.E. | 1 1 |
| University of Minnesota | 18 | Ph.D. (San. Eng.) M.P.H. M.S.P.H. M.S. in C.E. (San. Eng.) | 0 1 0 0 |
| University of Missouri | 0 | None | 0 |
| University of North Carolina | 3 | M.S. in S.E. M.S.P.H. M.P.H. | 2 0 0 |
| University of Toronto | 1 | M.A.Sc. | 1 |
| West Virginia University | 0 | M.S.C.E. (San. option) | 0 |
| | 64 | | 24 |

Classification of Graduate Engineering Degrees and Certificates Granted
in the Academic Year 1942-1943

TABLE 2

| <i>Degree or Certificate</i> | <i>Number of Students Receiving Degrees</i> | <i>Number of Schools Offering Each Degree</i> |
|--|---|---|
| Doctor of Philosophy | 0 | 7 |
| Doctor of Public Health | 0 | 1 |
| Doctor of Engineering | 1 | 1 |
| Doctor of Science | 1 | 2 |
| Doctor of Engineering Science | 0 | 1 |
| Master of Public Health | 3 | 4 |
| Master of Science in Public Health | 0 | 2 |
| Master of Science in Public Health Engineering | 1 | 2 |
| Master of Science in Sanitary Engineering | 2 | 2 |
| Master of Science in Civil Engineering | 0 | 2 |
| Master of Science | 10 | 9 |
| Master of Civil Engineering | 3 | 2 |
| Engineer in Civil Engineering | 2 | 1 |
| Master of Arts in Science | 1 | 1 |
| Master of Arts | 0 | 1 |
| Master of Arts in Civil Engineering | 0 | 1 |
| | 24 | |

In the academic year 1941-1942, 163 graduate students were enrolled in public health engineering and sanitary engineering courses as compared with 64 in the academic year 1942-1943. Graduate degrees and certificates granted in the academic year 1941-1942 totaled 89 as compared with 24 in the year 1942-1943.

TABLE 3 (Cont.)

| Name of Institution | Total Number of Graduate Stu- dents Registered | Physicians | Dentists | Health Educators | Public Health Laboratory Workers | Statisticians | Nutritionists | Teachers | Epidemiologists | School Health Personnel | Nurses | Public Health Engineers | Sanitarians | Industrial Hygienists | Social Workers | Unclassified | Graduate Degrees Offered | Number of Stu- dents Receiving Each Degree and Certificate |
|------------------------------|--|------------|----------|------------------|-------------------------------------|---------------|---------------|----------|-----------------|----------------------------|--------|----------------------------|-------------|--------------------------|----------------|--------------|---|---|
| University of California | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | {Dr.P.H. }M.A. | 0 |
| University of Kentucky | 1 | ... | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | M.S.P.H. | 0 |
| University of Michigan | 32 | 10 | 7 | 2 | 2 | 3 | 2 | .. | 3 | 1 | .. | .. | .. | 2 | .. | .. | {Dr.P.H. }M.P.H. | 2 15 |
| University of Minnesota | 4 | 1 | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | {Ph.D. }M.P.H. }M.S. | 0 0 1 |
| University of North Carolina | 72 | 25 | .. | 26 | 1 | .. | .. | .. | .. | .. | .. | .. | 5 | .. | .. | 15 | {Ph.D. }Dr.P.H. }M.S.P.H. }M.P.H. }C.P.H. | 0 0 0 1 0 |
| University of Pennsylvania | 14 | 12 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | {Ph.D. }M.P.H. }M.S. | 1 2 2 |
| University of Toronto | 22 | 21 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | {Ph.D. }D.P.H. ¹ }M.A. | 0 19 0 |
| Vanderbilt University | 7 | 7 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | M.P.H. | 2 |
| Yale University | 34 | 6 | .. | 6 | 6 | 2 | 2 | 1 | .. | .. | .. | .. | 1 | .. | 1 | 9 | {Ph.D. }Dr.P.H. }M.P.H. | 1 2 9 |
| Totals | 323 | 157 | 13 | 46 | 36 | 13 | 6 | 4 | 3 | 1 | 3 | 1 | 10 | 2 | 2 | 26 | | 159 |

¹ Diploma in Public Health² Diploma in Veterinary Public Health³ Certificate in Medical Technology

Air Disinfection in Day Schools*

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THE prevalence of respiratory infection during the season of indoor congregation¹ suggests a natural relationship between ventilation and communicable disease. Reduction by radiant air disinfection, of surgical infection² and cross-infection between sick children continuously exposed in pediatric wards,³ and continuous aggregations of infants in a nursery⁴ and children in an orphanage⁵ and dynamic spread of childhood contagion⁶ through intermittent aggregations in classrooms of day schools⁷ offers experimental evidence of the importance of sanitary ventilation in the control of respiratory disease. It may not now be premature in the interest of good design, to attempt a preliminary comparison of results from 6 years' study in one irradiated school with the results obtained under a different design during 3 years in two other schools.

GERMANTOWN FRIENDS SCHOOL

The educational standards which attracted pupils from a select class in a large urban population to the Germantown Friends School contributed much to the significance of the data. The social stability of this class insured

unusual continuity of the pupil population from entering susceptibility to graduating immunity, giving cumulative significance to epidemiologic school experience. The dispersal of the pupils through a narrow social stratum of a wide population minimized simultaneous exposure to local epidemics outside the school which might confuse the school pattern. Intelligent coöperation of the staff and parents guaranteed the reliability of the intimate records essential to intensive analysis of the spread of contagion, and health records available for the previous 5 years provided a helpful background.

School arrangements were also well fitted to the needs of the study. Except for a corridor connecting the third floors of the two buildings, the four susceptible primary grades were separated from the four intermediate and four senior grades. Each grade was divided into two classes of approximately 20 pupils in similar classrooms of about 6,000 cu. ft. capacity, ventilated by windows. Irradiation of the upper region of each "home" room above the 7 ft. level, by two crossed, "Safe-t-air" quartz tubes in a shallow aluminum pan reflector, especially designed for the purpose by the Hanovia Chemical and Manufacturing Company, provided uniform air disinfection. Central fixtures were also hung in the nature and music rooms and in the library, but corridors, lunchroom, gymnasium, shop and restroom were equipped according to special.

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needs. Correlation of sanitary and epidemiological indices of disinfection of standard "home" rooms then became the specific objective of the study.

SANITARY INDICES

Irradiation—The lethal rating of a tube was given as 1,000 milliwatts of 2,537 Å radiation. In a uniform parallel beam (as from the sun) radiation from two tubes could theoretically irradiate a cube of the same volume as a room to an intensity of 6.06 mw. per sq. ft.⁸ Since not more than half the radiation in all directions can be realized from artificial sources in a room with nonreflecting walls, the theoretical irradiation from half the lethal rating is arbitrarily adopted as 100 per cent efficiency.⁹ Irradiation efficiency is then derived from average intensity * (1.25 mw. per sq. ft.), yielding 42 per cent efficiency of irradiation.

Air Disinfection—It is possible by defining the lethal equivalent of an air change to express air disinfection in ventilation terms. The lethal rates of most pathogenic air-borne bacteria when exposed to ultra-violet radiation are similar enough to define the disinfection unit equivalent to one air change as the exposure required to reduce *Escherichia coli* atomized into dry air by 63.5 per cent—called a *lethe*. Thus it has been found that as uniformity of exposure is approached, a milliwatt foot of 2,537 Å radiation⁹ will approach the sanitary equivalent of a cubic foot per minute of air displacement, and we may assume for practical purposes this arbitrary definition of a *foot lethe* as the unit of radiant disinfection of air. Efficiency of disinfection, however, falls with variable exposure to different intensities indicated by low irradiation efficiency, but air circulation tends to equalize

exposure of air-borne organisms to variable intensities. The foot lethal equivalent of an air change per minute determined by bacteriological methods¹⁰ at the Germantown Friends School, divided by the computed milliwatt feet, gave 63 per cent disinfection efficiency. This effective utilization of irradiation certifies to the propriety of correlating this sanitary index with epidemiologic indices.

EPIDEMIOLOGIC INDICES

Secondary Class Incidence—An epidemiologic index of sanitary ventilation requires estimation of exposure, incidence, and susceptibility. Where outside exposure is eliminated by continuity of aggregation, and other modes of spread can be controlled, total incidence of respiratory disease may indicate air-borne infection. Uncertainty of diagnosis, multiplicity of exposure, and doubtful immunity, vitiate indices based upon colds among intermittent aggregations.⁷ Childhood contagions, largely confined to a narrow age stratum, and therefore less subject to simultaneous class incidence from extramural exposure, provides the best index of air-borne infection in schools.⁷ If we assume cases of measles, mumps, and chicken pox to be classroom infections when they appear within a proper incubation period after classroom exposure to pupils in an infective stage, the error will be small compared to difference needed to make contagious disease data significant. Though less determinate, this procedure is basically analogous to determining secondary attack rates in families.

Patterns—The occurrence of epidemic respiratory contagion among school children need not reflect upon the efficiency of sanitary barriers unless sanitary ventilation is generally practised in the community. Successful control of spread of contagion within the school will, on the other hand, alter

* Milliwatt feet divided by room volume in cubic feet.

Milliwatt feet = the summed products of angular flux density and radiant distance in feet⁹

epidemic rates and proportionate incidence, and ultimately modify immunity patterns in a school population. Thus increased susceptibility of grades following irradiation of the primary school, together with lower rate of spread and proportion of class secondaries may provide a more reliable index of sanitary control than comparisons of incidence between small "controlled" groups, for exposure cannot be "controlled." Conversely, successful control will indicate the importance of an aggregation among community channels of contagion spread.

Results—During the first year (1937-1938), 89 children in four primary classes constituted a protected group, and the same number of similarly susceptible children in four corresponding classes constituted a control group. Seven introductions of mumps into each group resulted in 12 secondary cases in the control group and only 2 in the protected group.

The whole primary department was irradiated during the next session, when another epidemic of mumps, commencing on October 3, spread dynamically (27 cases) through the intermediate department (65 per cent susceptible), but flickered out in both the primary and senior departments. Failure of epidemic spread in the senior department might be explained by lower susceptibility (56 per cent), but more probably by irradiation of the more susceptible (74 per cent) primary department.

Chicken pox introduced 21 times into the primary department (average susceptibility 59.8 per cent) between December and the closing of schools (1939-1940), resulted in only 7 possibly secondary infections. An explosive outbreak in a particular class singled out to rehearse a school play in an unirradiated auditorium, however, exhibited a typical air-borne pattern. On 4 successive days this class was exposed

to a missed case (sole secondary to a previous class exposure under the lights), diagnosed the evening before the play, and between the 14th and 20th day following the first day of exposure (May 8), 15 out of the 16 reportedly susceptible children came down in a static type of epidemic characterising intense common-source exposure.

SWARTHMORE STUDIES

The results of the first 3 years at the Germantown Friends School encouraged the extension of the demonstration to the small socially isolated college community of Swarthmore. The educational ideals of this community attracted an intellectually selected class of residents from Philadelphia, insuring in a public school system the epidemiologic advantages enjoyed in the private school at Germantown and similar epidemiologic opportunities to study the part the school played in community spread of a contagion. School cases embracing the whole childhood population became identical with community cases; so differentiation of outside and school exposure distinguished the part the school played in the community commerce in contagion.

The primary grades (kindergarten through the 6th grade) are accommodated in two schools, both merging into one high school of the 6 upper grades. The College Avenue Primary School is located on the same grounds as the High School, but the Rutgers Avenue School is about a mile away. This exposure of one-half of the primary population to upper grades constitutes an interesting variation between two otherwise equivalent epidemiologic and sanitary situations.

The modern school buildings were designed according to standard (Pennsylvania) specifications as to space, light, and ventilation. Mechanically ventilated classrooms of about 7,000 to 8,000 cu. ft. capacity, each accommo-

dating some 20 to 30 pupils, were equipped with four 30 watt fluorescent type of "Germicidal" tubes in high transmission glass, provided with fixtures by the General Electric Company. Corridors, lunchroom, gymnasium, and other places where children mingle, were not irradiated—an epidemiologic opportunity but a sanitary error.

Sanitary Indices—Two reflectors were installed on each end wall at 7 ft. levels, and not being specially designed for the purpose, directed the light beam upward at an angle of 60° from horizontal to avoid direct irradiation of the occupied zone. Only the remote angles between the end wall and ceiling were heavily irradiated, and ray lengths were limited to the distance between the light and the ceiling. Though the rated lethal radiation from the four tubes was tenfold that in the rooms at Germantown, the average irradiation in milliwatt feet per cubic foot (7.64) was only five times greater. The lower efficiency of irradiation (28 per cent as against 42 per cent) indicates a poorer distribution of irradiation, and a correspondingly low efficiency of disinfection (26 per cent as compared to 63 per cent at Germantown) yielded only two equivalent air changes per minute. The steep concentration gradients shown by tests made at different points in the room also indicated non-uniform exposure of the organisms.

MEASLES ⁷

During the 8 months, October, 1940, to May, 1941, more than 25,000 cases of measles were reported in Philadelphia—the largest number on record. Though the total cases in the Germantown Friends School and also in the Swarthmore schools exceeded the number in any one of the previous 10 years, this was not due to cases in the protected primary classes, but in the upper unirradiated grades where more than twice the total of the previous 9 years

occurred. Only 32 per cent of the school cases occurred in the irradiated classes, while 77 per cent occurred in these grades prior to irradiation. Since exposure outside the classrooms varies inversely with the proportion of school secondaries, the difference in irradiated and unirradiated rooms is even greater than these percentages indicate.

In the town of Swarthmore, hardly more than one-third (37.5 per cent) of the cases occurred at primary school ages, and nearly one-half (46.1 per cent) at high school age, but in Philadelphia as a whole, as in previous years, two-thirds of the cases occurred in primary school ages. In the district adjoining Swarthmore, the attack rate in three primary Nether Providence Schools was four times that in the corresponding high school, and in the grades corresponding to the irradiated grades of the Germantown Friends School, at the nearby William Penn Charter School, there were five times as many cases as in the upper grades.

Weekly attack rates among susceptibles in upper unirradiated classrooms were five times higher than in the irradiated primary classrooms. In the two primary schools sharing grounds with the upper schools, the attack rate was double that in the isolated Rutgers Avenue School at Swarthmore, though home secondaries showed no significant difference, and the small proportion of class secondaries also implicated upper school exposure rather than epidemic spread within their own classrooms. The curve of proportionate decline in the percentage of susceptible children in irradiated and unirradiated rooms during the course of this epidemic (Chart I) shows higher percentage susceptibility in the protected classes after the epidemic had passed than in the control classes before it commenced. The inflection point of this curve coming 13 days (incubation period of measles) after that for the unirradiated classes, like-

MEASLES

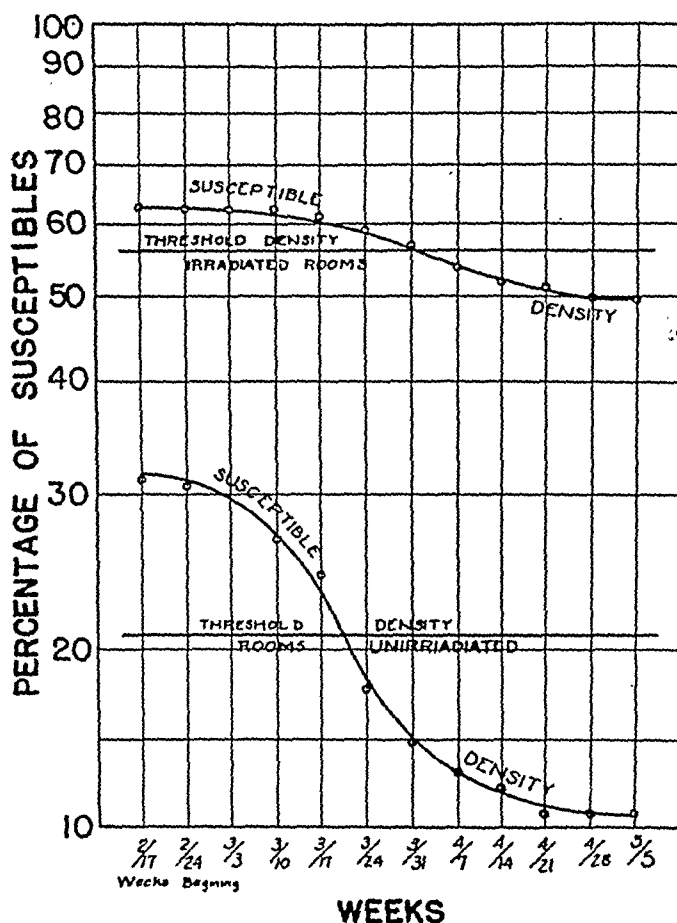


CHART I—Measles susceptibility in Germantown Friends School and Swarthmore Public Schools during 1941 epidemic (primary classrooms irradiated). Threshold density of susceptibles indicated at point of inflection in accordance with McKendrick's theory.

wise indicates secondary spread from the unirradiated school rather than dynamic spread within the primary irradiated classrooms.

The swift course of the epidemic through the schools swept out susceptibility before secondary spread in the community could become established, and so accounts for the similarity in pattern at the Germantown Friends School and in Swarthmore. Occasional class secondaries in some of the irradiated Swarthmore classrooms were overlooked, since the lights were not operated from a central switch as at Germantown, but responsibility rested

on each teacher for her room, and more than once the principal was called out after sundown to attend to a "peculiar violet light" in his school.

MUMPS⁶

The dynamic pattern of spread of mumps through the community of Swarthmore during the succeeding year accentuated epidemiologic and sanitary complications in an experimental study of air-borne infection among human aggregations. A case of mumps, exposing the 3rd grade of the College Avenue School on September 29 and 30, detonated an explosive accumulation of

susceptible material. On the second and third generations, synchronous epidemic waves were initiated in the 1st and 2nd grades, respectively. Waves of decreasing amplitude then fanned out on an ever-widening front through the entire population of Swarthmore during the remainder of the season.

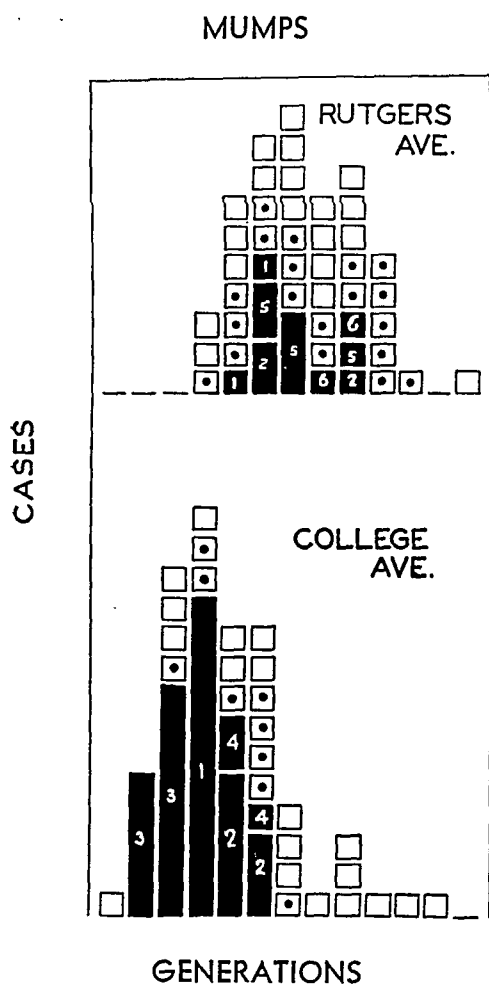


CHART II—Mumps in Swarthmore Primary Schools, 1941-1942. Cases plotted against generation periods. First introduction September 30. Each bar represents one generation period beginning October 7, 25, November 10, 27, December 14, January 1, 19, February 6, 24, March 14, April 1, 19, May 9. Black bars indicate class secondaries defined by cases occurring from 13th to 22nd day after class exposure on day of onset or previous day. White numbers on black bar represent the grade. White squares represent extra class infections. Black dots indicate home secondaries.

The localization of epidemic classroom spread (indicated in black on Chart II), to classes exposed during the fall, contrasts with the generalized endemic smouldering through the community after classroom spread ceased with the onset of cold weather. Thus the secondary class incidence at the College Avenue School, exposed earlier in the season, was more than double that in the more susceptible and more heavily exposed Rutgers Avenue School. In three primary classes first attacked, 32 out of 42 cases could have been secondary to 23 classroom exposures, but only 15 of 73 cases in 11 remaining primary grades of comparable susceptibility could have been secondary to 30 class exposures. Similarly, 31 of 51 cases in the two primary schools could have been infected by 18 class exposures between September 30 and November 19, yet 53 class exposures between November 18 and April 7 could account for no more than 16 of the 64 cases infected after November 18, and probably some of these were extra-class infections. Some factor favorable to epidemic spread of mumps during mild, moist, fall weather appeared to be under control during the cold winter weather.

Epidemic spread of mumps through these irradiated classrooms in the fall, if air-borne, presents a sanitary complication. Direct experimental evidence that mumps virus can be spread through the air, or destroyed by ultra-violet lights, is indeed lacking, and the epidemic behavior of mumps is notoriously erratic. But epidemiologic evidence indicates that "the infective agent of mumps is transmitted by the air"¹¹ epidemically as well as endemically by salivary communism,¹² and epidemic spread in irradiated classrooms seemed in previous winters to be controlled, and ceased this year with onset of cold weather. An air-borne pattern between the season of abundant window ventilation and the season of dry indoor air

could be explained if the viricidal efficiency of the irradiation is decreased at high humidity.¹³ Between September 30 and November 19, weather reports indicate that on 16 days indoor relative humidity exceeded 70 per cent; on 19 days 60 per cent, and 27 days 50 per cent, accountable for a loss of more than half of the bactericidal efficiency in dry indoor air during cold weather. The problem, however, is too serious to be dismissed without further exhaustive laboratory and field investigation.

During the winter, the school now plays a more important rôle in spreading contagion among high school ages than among the primary school children in the town of Swarthmore, and the College Avenue School similarly plays a more important rôle in the spread of contagion among primary school children than the Rutgers Avenue School. Except for minor episodes unattributable to design, but which do emphasize the importance of vigilant servicing, the last year has been uneventful.

DESIGN

A truly quantitative specific secondary attack rate would require correction for time and intensity of exposure, multiple infections, and susceptibles exposed. Under epidemic conditions where rapidly increasing exposure corresponds with a large decrease in susceptibility, the correction would be greater than under sporadic conditions of spread. In fact, the necessary condition of epidemic spread, a higher specific secondary incidence than specific exposure, would normally be unobserved, for indicated secondary incidence ordinarily approaches indicated exposure. Actual differences in rate of spread would therefore exceed differences in the indicated ratio of secondary incidence to exposure.

During the period of dry indoor air, about one in every four exposures of

irradiated classrooms to measles, mumps or chicken pox was followed by one or more secondary cases, both at the Germantown Friends School and in the Swarthmore primary schools. A third more cases per outbreak at the latter indicates that failures, though no more frequent, were more serious—epidemiologic confirmation of the sanitary indices of disinfection efficiencies. In neither case does the ratio of secondary incidence to exposure correspond with an epidemic condition of spread indicated by the nearly equal number of secondary cases and exposures in the unirradiated intermediate department of the Germantown Friends School and unirradiated primary schools. In the absence of records of classroom exposure prior to irradiation, it is still possible to estimate crude presumptive primary and secondary incidence by assuming that all cases exposed their classes. The number of presumptive "secondary" cases indicated under this assumption has been reduced to less than one-third by irradiation of classrooms, though the number of presumptive "primary" cases has not been markedly changed.

It may seem somewhat contradictory that rooms with double the disinfection, five times the irradiation, and ten times the radiation should prove to be hygienically less efficient, though this is consistent with the lower sanitary indices of disinfection and irradiation efficiencies. It indicates that respiratory organisms travel less frequently from person to person through lethal zones. Bacteriological tests showed that rotation of the reflectors to throw a horizontal beam across the room increased irradiation more than threefold and disinfection more than tenfold. That an even greater hygienic efficiency can be expected has been indicated by the superior epidemiologic indices within rooms with one-half the disinfection and one-fifth the irradiation but with higher disinfection and irradiation efficiencies.

SUMMARY AND CONCLUSION

1. Epidemic spread of childhood contagion in irradiated classrooms during winter months appears to have been checked for 6 years at the Germantown Friends School and for 3 years in two primary schools at Swarthmore. Measles, mumps, and chicken pox prevailed during the same period in unirradiated classrooms in these schools and in nearby primary schools.

2. Epidemic spread of mumps in irradiated classrooms (of one of these schools) exposed during the fall was checked with the onset of cold weather.

3. Failure of the lights to control the epidemic spread of mumps during the moist, mild autumn weather suggests that the viricidal activity of ultra-violet light decreases with humidity. When respiratory infection is normally most prevalent during cold weather and indoor air is dryest, irradiation was efficient.

4. The importance of the classroom in the epidemic spread of childhood contagion through the community of Swarthmore was revealed by radiant disinfection of the air of the primary schools.

5. The design which yields the highest average intensity per unit of ultra-violet light radiated into a room (i.e., highest efficiency of irradiation) will generally accomplish the most disinfection per unit of intensity (i.e., highest efficiency of disinfection), and prove hygienically more effective per unit of disinfection (i.e., highest hygienic efficiency). An installation with several times the radiation per cu. ft. performed less consistently, according to epidemiologic indices, than one with higher

efficiencies of irradiation and disinfection.

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Some Medical Aspects of Protein Foods*

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SINCE protein in adequate quantity and quality is necessary for all forms of life, its relation to problems of health and disease are without limit. But to be more specific and practical one may mention some of the problems of medical interest where there is experimental evidence for the importance of protein. Some of these are listed in Table 1.

TABLE 1

Problems of Medical Interest Related to Protein Foods

Physiologic:

| | |
|-----------------|-------------------------------|
| Growth | Immunity and Resistance |
| Pregnancy | Absorption of Other Nutrients |
| Lactation | Appetite |
| Bone Formation | Hunger |
| Blood Formation | Fatigue |

Pathologic:

| | |
|--------------------|--------------------------------------|
| Convalescence | Edema |
| Wound Healing | Obesity |
| Diseases of Liver | Wasting Diseases |
| Diseases of Kidney | Impaired Gastrointestinal Absorption |

It may be well to recall at this time the difference between the terms protein foods and protein. Protein foods are sources of protein, but they are also excellent sources of other important nutrients—minerals, vitamins of the B-complex, and frequently fat and fat soluble vitamins. In practical human nutrition, in nutritional studies on human subjects, and in clinical therapeutics, it is usually impossible to separate effectively these various nu-

trients furnished by protein foods. Hence it is difficult to interpret the results precisely. Thus a high protein diet usually results in an increase of other important nutrients and a low protein diet may be deficient in nutrients other than protein. It is obvious and imperative that if any significant decrease in the protein supply of an individual or of a nation is considered, an accurate evaluation of nutrients other than protein, but generally furnished by protein foods, be made.

How much protein does a healthy adult require? How much of this protein requirement must be supplied by animal protein as compared with vegetable protein? Does exercise increase the protein requirement? These are old questions that have brought forth warm discussion ever since the days of Rubner and Voit—and questions which are still under discussion. Today the protein nutrition of mammals is recognized as nutrition by essential amino acids, and research of the last two years has shown that man fits well into this concept. Thus Holt and coworkers at Johns Hopkins have shown that tryptophane, lysine, and methionine are required for the maintenance of nitrogen equilibrium in man and that arginine is essential for normal spermatogenesis. Rose at Illinois has recently maintained nitrogen equilibrium in young adults on a mixture of eight amino acids. Whipple at Rochester has found that a mixture of

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pure amino acids is as effective in restoring plasma protein, and presumably therefore body protein, as such proteins as casein and beef serum. The answer to how much protein one requires is simply that amount of protein which provides an adequate quantity of essential amino acids. It makes little difference whether they are furnished by animal or vegetable protein. Data available at present, however, are too fragmentary to provide accurate information concerning either the amino acid composition of various protein foods or the quantity of essential amino acids required by man.

From the practical viewpoint, the protein requirement of man is definitely related to the amount of carbohydrate and fat in the diet. If there is sufficient energy yielding food available so that protein will not be used appreciably as a source of energy, then the protein requirement will be considerably less than if a significant amount of the protein is required for calories.

We should like to mention briefly a recent investigation* which gives considerable practical information on the questions of protein requirement, how much of this should be animal protein, and the effect of exercise on the protein requirement.

This was a study of dietary protein in relation to physical efficiency which was planned and conducted by R. E. Johnson, R. C. Darling, and W. H. Forbes of the Harvard Fatigue Laboratory with the coöperation of the Division of Nutrition of the Medical and Public Health Schools of Harvard University. The subjects were 24 volunteers from Civilian Public Service Camp 32, West Campton, N. H. They were all

physically normal young men who continued their usual activities about the camp throughout the course of the experiments. The range of daily caloric expenditure, depending on the subject's job, was 2,400 to 5,000. Every attempt was made to interfere as little as possible with the normal daily routine of the subjects.

The men were divided into 3 groups of 8 men each. The normal control group subsisted on the camp diet, which by the standards of the Food and Nutrition Board of the National Research Council was good, and provided an average of 100 gm. of protein a day. The low protein group subsisted on a diet from which all meat, eggs, fish, nuts, legumes, cheese, and almost all milk were excluded. Their diet consisted essentially of cereal products, potatoes, other vegetables, fruit products, and oleomargarine, with not over 4 oz. of milk and cream a day. The high protein group was encouraged to replace low protein foods with foods rich in protein, such as meat, milk, cheese, eggs, nut products, especially peanut butter, and legumes. Following a 2 week period of observation when all of the subjects were on a normal diet, the experimental regime was followed for 2 months. Then for 2 weeks, the normal group continued on a normal diet, the high protein group reverted to normal, and the low protein group turned to high protein. No attempt was made to limit total caloric intake.

On each of the subjects the following observations were made: (1) a thorough medical examination during the normal period and at the end of the experimental period, (2) periodic estimation of red blood cells, white blood cells, hemoglobin, and differential count, (3) routine clinical examination of the urine, (4) medical interview once a week to ascertain if the subject was suffering from any complaint attributable to the

* The investigation referred to in this part of this paper was done under a contract, recommended by the Committee on Medical Research, between the Office of Scientific Research and Development and the Harvard Fatigue Laboratory. The work will be reported in detail in a forthcoming paper by R. E. Johnson, *et al.*

diet, (5) weekly assessment of general physical fitness for hard work by the "pack test," which is a standardized exercise tolerance test designed by the Harvard Fatigue Laboratory, (6) weekly estimation of serum non-protein nitrogen, albumin, and globulin, (7) weekly estimation of nitrogen in a 24 hour specimen of urine, (8) meal by meal record of dietary intake (all food was either weighed or dispensed in standard portions and diet calculations were made daily. Standard food tables were used and the results obtained were frequently checked by direct analysis of food samples.), (9) a daily caloric expenditure in work was estimated from a continuous hour by hour diary kept by each subject.

The average daily protein intake of the low protein group was about 50 gm., of which not more than 5 gm. was in the form of animal protein. The 4 to 5 gm. of animal protein was furnished by milk used in some of the cooking and occasionally on breakfast cereals. The normal group averaged 100 gm. of protein intake, of which about 60 gm. was animal protein. The high protein group had an average daily protein intake of about 160 gm., mostly animal protein. No members of the low protein group, not even the hardest worker, who averaged about 5,500 calories expenditure on a working day, suffered measurable deterioration in physical vigor. The only symptom that could be attributed to the low protein diet was voiced by the two hardest workers, one a farmer and the other a man engaged in hard work in the woods. These men usually felt quite hungry about 11:00 a.m. and 4:00 p.m. Nevertheless, their day's work did not suffer from the low protein diet. No significant changes were found in serum albumin or globulin of the low protein group. In view of Chittenden's finding that a low protein diet is in fact beneficial to physical vigor and efficiency, it may be

mentioned that the physical fitness of the subjects on the low protein diet was no better than that of the control or high protein groups. In the high protein group no measurable benefit to physical fitness from this large amount of protein could be observed in 2 months. No significant change was found in the serum albumin or globulin.

Thus, throughout a period of 2 months no measurable influence, either deleterious or beneficial, was seen in the physical vigor or efficiency in daily work of healthy young men subsisting on a diet providing 50 gm. of protein, of which not more than 5 gm. was animal protein. Likewise no beneficial or deleterious effect was observed in 2 months from a diet providing 160 gm. of protein, most of which was animal protein. One should emphasize that both of these diets were adequate with respect to calories and that a yeast concentrate was provided daily to the low protein group to insure an excess of vitamins of the B-complex.

It seems reasonable to conclude from this experiment that a daily protein intake of 50 gm., of which as little as 5 gm. consists of animal protein, is perfectly adequate for good health and efficiency providing, and this is a most important proviso, the diet is adequate in other respects, particularly calories and thiamine. In addition, confirmatory evidence is offered that exercise or hard manual labor does not increase the protein requirement. One might ask: why a diet of less than 50 gm. was not used in the low protein group. The reason is that it is practically impossible to plan a reasonably palatable diet of ordinary foods which will supply 3,000 to 5,000 calories and yet not contain that amount of protein.

This experiment should not be interpreted as implying that protein requirements of the normal adult can safely be reduced to 50 gm. per day, of which only 10 per cent need be ani-

mal protein—not unless the diet is adequate in other respects. In dealing with the health of the public it is no doubt safer to rely on a protein level of at least 70 gm. per day for the average adult man and 60 gm. per day for the average adult woman as recommended by the Food and Nutrition Board.

Interesting data on dietary protein and signs of protein deficiency have recently been reported by Youmans.¹ Out of a group of approximately 1,100 individuals in Tennessee that were studied in considerable detail, there were some 40 per cent who had a dietary protein intake of less than 50 gm. daily. In these 450 individuals who had been receiving less than 50 gm. of protein per day, probably for most of their lives, only 5 subjects, or 0.9 per cent, had clinical evidence of protein deficiency. Furthermore, the caloric intake of these subjects was in general low, and it is entirely possible that with an adequate caloric intake no signs of protein deficiency would have occurred.

A nutrition problem of industrial importance, and one which is of medical interest, is the fatigue and weakness that is occasionally experienced about 3 hours after eating a meal high in carbohydrate. Efficiency experts have long recognized the desirability of supplying intermediate supplementary nourishment to maintain the performance of office and factory personnel throughout the working day. In clinical medicine it is well known that a pronounced fall in blood sugar, usually accompanied by excessive fatigue and weakness, frequently follows the ingestion of large amounts of relatively pure carbohydrate. Thus ingestion of a typical American breakfast—one relatively high in carbohydrate and low in protein and fat content—predisposes to mid-morning hypoglycemia with its consequent weakness

and fatigue. Interesting experimental confirmation of this view has been obtained² by comparing isocaloric meals of varying composition. It was found that the ingestion of a breakfast high in carbohydrate was followed by symptoms of weakness, hunger, and fatigue in approximately 3 hours. An isocaloric breakfast high in fat was followed by similar symptoms but of lesser degree and after a longer time. An isocaloric breakfast high in protein was followed by an improved sense of well-being and no symptoms of hypoglycemia. The blood sugar levels following these three breakfasts corresponded closely to the clinical symptoms.

What are the effects of various diseases on the protein requirement? Are there diseases which result in a decreased protein requirement or in which a protein requirement below the recommended 1 gm. per kg. of body weight is desirable from the viewpoint of therapy? There are no diseases known which result in a decreased protein requirement.

In diseases which result in a marked increase in the non-protein nitrogen of the blood, such as certain phases of renal insufficiency, a low protein diet is desirable. However, nothing is gained by reducing protein intake below protein requirement, even in a patient with increased nitrogen in the blood, since any deficit in dietary protein will be made up by using body protein. Hence nitrogen end products to be excreted are not reduced, and in addition the body has suffered loss of tissue protein. In essential hypertension, or in renal disease in which the blood non-protein nitrogen is not markedly elevated, a diet of normal protein content, that is 1 gm. of protein per kg. of body weight is not contraindicated.

What of high protein diets? Are they harmful to the normal individual? Are they frequently desirable in clinical medicine? They most certainly are not harmful to the normal indi-

vidual and they are quite desirable in many clinical conditions. It is possible here to mention only some of the more obvious examples. The Eskimo is noted for robust health, and the diet of the Eskimo is very high in protein and fat.³ Explorers to the arctic and antarctic regions have occasionally existed for long periods of time on diets consisting almost entirely of protein and fat. This recalls the well known case of Stefansson who after many years of arctic exploration, during which time he lived on a high protein intake, lived in this country for one year on a diet consisting entirely of protein foods and fat. Prior to food rationing in this country it was common for many people to have a protein intake averaging 150 gm. per day, and to experience no harmful effects from such a high protein intake—in fact, such individuals are usually vigorous and robust.

In diseases characterized by loss of protein, such as nephrosis and the early stages of nephritis, or in cases of hypoproteinemia, naturally a high protein diet is very desirable. High protein diets are also of definite value in muscle wasting diseases. In fact, because protein foods carry with them abundant amounts of essential nutrients in addition to protein, their use in generous amounts in most diseases, particularly in convalescence, is to be recommended.

Recent investigations have indicated that dietary protein favors the absorption of calcium, of riboflavin, and of niacin. Lehmann and Pollak⁴ found that the carbonates and phosphates of calcium were considerably more soluble in solutions of amino acids than in pure water. McCance, Widdowson, and Lehmann⁵ using human subjects studied the effect of low and high protein diets, controlled experimentally by equal caloric rations of carbohydrate and fat, on calcium absorption. With

a calcium intake of 630 mg. per day, a protein intake of 100 to 130 gm. resulted in the absorption of 94 mg. of calcium, whereas on the lower protein intake of 45 to 70 gm. per day only 32 mg. of calcium were absorbed. Thus calcium absorption was about three times as great on the higher protein intake. This observation fits in well with the fact that lean meat has a definite antirachitic effect and that skim milk decreases the vitamin D requirement.

It should be pointed out that generally in thinking of bone growth and nutrition one is apt to think principally of calcium, phosphorus, and vitamin D, and it should be recalled that bones have an extensive protein matrix. This protein matrix is equally necessary for proper bone formation, maintenance, and repair. It is a common clinical observation to find adults who have a low calcium intake and yet have no demonstrable findings of calcium deficiency, though frequently such individuals have a high intake of protein. In spite of a low calcium but high protein diet, the Eskimo possesses excellent teeth and bones. Thus there is evidence that a good level of protein in the diet may convert an otherwise poor calcium diet into one supplying sufficient amounts of this mineral.

There is considerable evidence that a relationship between protein metabolism and the vitamin B-complex exists. Recent additions to the experimental evidence supporting this relationship are the findings of Perlzweig and co-workers⁶ that in rats and dogs, high protein diets favor retention of riboflavin and of niacin as judged by urinary excretion studies and also by actual tissue analyses for these vitamins in animals on low and high protein diets. As far as we know, investigations on human subjects with regard to absorption or retention of riboflavin or niacin have not been done, but it is

possible that, as in the case of calcium, a diet high in protein may favor retention of riboflavin and of niacin, and hence assist in securing adequate amounts of these nutrients from a dietary regime in which, in other circumstances, the amounts of these vitamins would have been suboptimum.

Have present wartime food conditions in this country posed special problems with respect to protein foods and the *health* of the people? It is our belief that the answer to this question is definitely no. True, certain protein foods are rationed and others may be rationed, but as long as this country has access to a plentiful supply of calories, and a variety of whole grain cereals and legumes, it is most unlikely that *impairment of health* from protein deficiency will ever occur. But there are very definite economic problems, as evidenced recently by the plentiful amount of livestock on the western ranges and the amounts of meat available at consumers' markets. And there are definite psychological problems of convincing a population used to eating a high protein diet that one of much lower protein content, and low in animal protein, will not necessarily impair health. Lumberjacks may demand plenty of red meat to get timber cut, but that demand rests on habit and not on a nutritional or medical basis.

Post-war feeding operations in war-torn countries will demand large amounts of protein foods until the agricultural economy of those lands can be restored to such a level that they can contribute effectively to their own nutritional support. But there are protein foods that could be made available in this and other countries; protein foods which are stable and of which stock piles could be created for the time when they are needed in large amounts; protein foods which are superior not only in protein but in other

essential nutrients. We refer specifically to wheat germ, corn germ, yeasts, dried legumes, and the various products which can be made from peanuts and soybeans. There is sufficient experimental evidence in animal nutrition that the vegetable proteins we have mentioned are high quality proteins. They have an excellent supplementing quality among themselves and when used with the more common vegetable proteins—and man does not live exclusively off of any one or two proteins. We do know that when properly prepared these superior vegetable proteins are well digested by human beings. True, their adequacy for human nutrition is in most cases not well known, but let us not reject them because of this. It seems to us that all too frequently there is far too much of a lag between research findings in animal nutrition and their application to human health. On the other hand, it is equally unfortunate, in the absence of experimental data, to proclaim that any of these lesser used protein foods are definitely superior in human nutrition to the more common protein foods on which we have considerable data.

SUMMARY AND CONCLUSION

1. The protein requirement of man cannot in the present state of knowledge be quantitatively stated in terms of amino acids, under certain standardized conditions.

2. Calorie intake from carbohydrate and fat spares protein, and in the presence of sufficient calories from non-protein sources, the amount of protein in the ordinary diet of an active adult may be safely reduced to 50 gm. per day, of which as little as 5 gm. may be in the form of animal protein. The experimental evidence supporting this latter statement is limited to an 8 week observation period; however, there is no reason to suspect that it would not hold for much longer periods. The recent findings of Youmans support this view.

3. The protein requirement is not increased in exercise, and physical fitness and efficiency are not impaired or improved on low protein diets adequate in other nutrients.

4. Substituting protein for some of the carbohydrate in the common American breakfast is a feasible way to prevent mid-morning symptoms of fatigue.

5. High protein diets are not harmful to the normal adult and are of definite therapeutic value in many diseases and particularly in convalescence.

6. Certain less common protein foods exist which are of high nutritional value, and which could be used with considerable value in post-war feeding operations.

7. We should not forget that protein foods are excellent sources of nutrients other than protein, and we cannot reduce the protein of a diet unless at the same time we provide the other essential factors contributed by protein foods.

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Studies on Epidemic Diarrhea of the New-born: Isolation of a Filtrable Agent Causing Diarrhea in Calves*

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DURING the past two years we have had the opportunity of studying six separate epidemics of diarrhea of the new-born occurring in three hospitals in the Baltimore-Washington area. This study has been approached from the standpoint of a possible filtrable agent etiology of the disease.

The first two epidemics occurred almost simultaneously at two Baltimore hospitals in the early fall of 1941. Stools, blood, and nasal washings were obtained from a number of the babies and injected by various routes into a variety of the smaller animals. No definite disease resulted in any of the animals.

The subsequent four epidemics occurred during 1942, two of them in the full-term nursery of a Baltimore hospital and two in the premature nursery of a Washington hospital. All four were characterized by a high morbidity rate; in the last three of these epidemics the mortality was high, while in the first, occurring among full-term babies during the month of March, the mortality was low. Stool cultures were uniformly negative for known diarrhea-

producing organisms. In each of the four epidemics, stool of affected babies was given nasally to a calf. This material was Seitz filtered in three of the instances, unfiltered in the fourth. In all four instances there followed in the calf a bloody, mucoid diarrhea with comparable incubation period and clinical characteristics.

On the first occasion in which this result was obtained in the calf, the question arose as to whether attempt at further serial calf-to-calf passage would be worth while. The calf, like the human infant, is naturally prone to diarrheal episodes from a variety of causes, and the mere occurrence of diarrhea following injection in a calf would not necessarily signify that successful passage had been carried out. However, in view of the presence of blood and mucus in the stools of this first calf, it was hoped that if there were an agent here which could be passaged, the clinical picture in the calf might be distinctive enough to provide fairly reasonable assurance of successful passage. This hope has apparently been realized; successive calf passages were found readily possible with each of the four strains and the results of cross-immunity studies have indicated that the four strains represent a single agent.

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Up to the present time this disease has been produced in a total of 84 calves. In the case of the first strain there have so far been carried out 29 successive passages, 10 of which were with filtered material; with the second strain 4 successive passages, 2 of them filtered; with the third strain 8 successive passages, 6 filtered; and with the fourth strain 2 passages, both filtered.

The majority of the calves used have been of the Guernsey breed, and these were found quite satisfactory. In Holstein calves the disease did not seem quite so typical and one Holstein calf was apparently not susceptible. Aside from this single animal, the calves used were found uniformly susceptible. Ages of the animals ranged from 2 days to 2 months. Most of them were in the 1 to 3 week age period, and in calves older than this the clinical disease tended to be milder.

Passage material consisted of saline suspension of infected calf stools obtained during the acute stage of the disease. The material was frozen when obtained and stored in a dry ice container until ready for use, then thawed at 37° C. and given by simple nasal injection. The minimum dose uniformly successful in passage was 1.0 ml. With Seitz filtrate preparations of this material a larger dose was necessary, the smallest successful dose ever used being 8.0 ml. Material given nasally to the unanesthetized calf is swallowed and it may be that the portal of entry for the agent is actually within the gastrointestinal tract, as the one attempt made at passage through the use of a stomach tube was successfully accomplished.

The clinical disease in these calf-to-calf passages was quite similar to that which followed the injection of material from the babies in the four epidemics mentioned above. The incubation period regularly ranged from 2 to 5 days. The disease itself, though ex-

hibiting a certain amount of variability, was uniformly characterized by the occurrence of diarrhea with the production of mucus, usually in very large amounts. Almost every calf also showed blood in the stools at some time during the course of the disease. As a rule, constitutional reaction was minimal, and aside from mild dehydration and anorexia at the height of the process, the calves would usually not seem particularly ill. Temperatures were taken on a few of the calves and very little fever was found.

The disease proved to be of a peculiarly relapsing nature in the calf, and in rare animals the mucoid diarrhea actually became chronic. In those calves which survived, the total duration of the process varied from 8 to 54 days; in the average case the duration was in the neighborhood of 3 weeks. Most of the animals recovered, the mortality being about 13 per cent. Immunity was found to be present following recovery, large doses of active material then causing no disease.

On gross pathological examination both small and large intestine showed hyperemia, while the intestinal lymphoid tissue was swollen and the mesenteric lymph nodes appeared enlarged. Microscopically, there were found areas of infiltration of the intestinal wall with polymorphonuclear leukocytes and in one very severe case ulcerations of the mucosa, while the intestinal lymphoid tissue and the mesenteric lymph nodes appeared hyper-plastic.

Three attempts were made at passage with the use of the blood of infected calves. The first attempt failed. The other two, made with blood taken from exceptionally sick calves during the latter part of the first week of the disease, were successful, and it is interesting that one of the calves that came down from this material had been inoculated by the subcutaneous rather than the nasal route.

Susceptible calves exposed to infected calves were found to acquire the disease by cross-infection. In a few of the instances the disease thus acquired was clinically very mild, with relatively prolonged incubation period, but in most of the cases the picture produced was quite typical.

In view of the fact that cross-infections could occur, it was obviously necessary to enforce strict isolation of animals used in this study. This was accomplished by isolating calves singly in a number of widely separated areas such as farms where there were no other calves present.

In a consideration of the probable nature of the agent discussed in this paper, one of the first questions that comes up refers to the possibility that it is present in normal infant or calf stools. In this connection, the stools of 4 normal calves were given nasally in large dose respectively to 4 different calves. No disease resulted in these animals. The stools of 8 normal newborn infants were similarly tested, a pool of stools from 2 separate babies being given to each of 4 calves. Again no disease resulted.

As to the properties of the agent, it was found to be readily filtrable through Seitz filters, and cultures of filtrates on various aerobic and anaerobic media have been uniformly negative. The longest series of successive Seitz filtrate passages that was attempted was 4, and this was successfully completed, each calf in the series receiving Seitz filtrate of the stools of the calf that preceded him in the series. In view of the fact that the agent was not found in the stools of normal calves, this would seem to indicate that it is self-perpetuating.

Activity is maintained for at least 2 months when the material is frozen at -70° C. and stored in dry ice. Material which has been dried from the frozen state seems to undergo attenuation, and when used in passage results in the pro-

duction of a very mild disease of short duration, with prolonged incubation period. This very mild disease produces immunity, as a subsequent inoculation with fully active material results in no observable disease. When the stools from this very mild disease are further passaged, 2 serial passages result in the reestablishment of full virulence.

Heat inactivation experiments, carried out by the submerged sealed tubes method, are as yet incomplete. The data so far available seem to indicate that the agent is not regularly inactivated by boiling for 5 minutes, but is regularly inactivated by boiling for 10 minutes. Heating at 70° C. for 1 hour apparently fails to inactivate the agent, but heating at 80° C. for 1 hour results either in complete inactivation or in attenuation.

Protection tests were carried out with the use of the sera of 6 babies recovered from the epidemic in connection with which the first strain of the agent was obtained. The data on these tests would require discussion too lengthy for the present occasion, but, in brief, it appeared that two of the sera showed complete protection, two showed probable protection, and two showed partial protection. In this connection, with reference to the antigenicity of the agent, a rabbit was given repeated small intravenous injections of Seitz filtrate of infected calf stool. Following this his serum showed protective antibodies. This experiment was controlled by the use of serum from a non-injected litter mate.

The question arises as to whether this disease occurs naturally among calves. The opportunity came up to study two herds of dairy cattle more or less chronically infected with calf scours. In one of these herds a calf was found whose clinical picture was quite similar to that of the calves infected with the agent described above.

The studies which were carried out, however, indicated that the cause of his disease was not this same agent, and at the present time it is impossible to say whether or not this disease occurs naturally among calves.

In this connection, another question comes up which refers to the possibility that this agent might actually be identical with the pneumoenteritis virus, isolated by Baker¹ from a natural disease of calves characterized clinically by pneumonia and diarrhea. Though samples of this virus were not available for experimental comparison, it seems unlikely on the basis of the evidence at hand that the two agents are the same, first because of the absence of

pneumonia in the calves affected by the agent discussed in this paper, and second because of failure with it of transmission to mice even after a number of serial mouse passages.

The conclusions which seem justified from the data presented are:

1. In connection with four separate epidemics of diarrhea of the new-born a filtrable agent has been isolated which regularly produces diarrhea in calves.
2. In the attempts so far made, this agent has not been isolated from the stools of normal infants or normal calves.
3. The evidence suggests, though it is not conclusive, that the agent may be a cause of epidemic diarrhea of the new-born.

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Streptococcal Infections in a Naval Training Station*

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WHENEVER an epidemic of streptococcal infection strikes a civilian population group, it is practically always caused by some single strain of streptococcus of high disseminating ability, either one already present which has recently increased its distributing powers or one newly introduced into the community from without. Endemic infections, on the other hand, are usually due to a number of different types of low disseminating ability which are part of the streptococcal flora of the community.

Since civilian communities are relatively static in composition, the changes in the streptococcal flora take place slowly. Outbreaks are infrequent and usually limited to the immediate population group. During wartime mobilization and training of troops, however, the conditions are entirely different. Men from diverse communities are collected into camps and stations; the opportunity for importation of some highly active strain or strains is therefore great. Furthermore, the men are housed by groups in barracks and congregated in mess-halls and

drill sheds so that the chance of dissemination of any strain of streptococcus is multiplied.

For this reason, we have undertaken a study of streptococcal infections in a naval training station for the purpose of gaining a better understanding of the epidemiological principles involved under these conditions and with the hope that some control measures might be developed.

At the naval training station raw recruits were formed into companies of approximately 125 men for a period of 10 to 12 weeks' training. Two such companies were housed in each barracks, one to a floor. Although each company was trained largely as an individual unit, there was frequent opportunity for contact between companies in mess-halls, drill sheds, and at recreational gatherings.

A representative company in its third week of training was chosen for the study which began on April 2 and terminated on May 7, 1943. A special history form was prepared for each man and all pertinent data were entered as collected. Throat cultures for streptococci were taken from each man on the first day of the study and twice a week thereafter. Sick call was held at 8 a.m. every day and any illness noted. Where

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TABLE 1

*The Streptococcal Illnesses Which Occurred in the Study Company
and the Types of Streptococci Responsible*

| Illness | Causative Type of Streptococcus | | | | | | Number of Cases |
|------------------------|---------------------------------|----|----|----|----|----|-----------------|
| | 1 | 3 | 6 | 12 | 19 | 39 | |
| Scarlet fever | .. | 2 | .. | .. | .. | .. | 2 |
| Tonsillitis | 8* | 2* | 10 | 1 | 1 | 1 | 23 |
| Pharyngitis | .. | .. | 8† | 2 | 2† | .. | 12 |
| Pharyngitis-laryngitis | 1 | .. | .. | .. | .. | .. | 1 |
| Laryngitis | .. | .. | 2 | .. | .. | .. | 2 |
| Peritonsillar abscess | .. | .. | 1 | .. | 1 | .. | 2 |
| Total | 9 | 4 | 21 | 3 | 4 | 1 | 42 |

* Same man had two attacks of tonsillitis due to two different types.

† Same man had two attacks of pharyngitis due to two different types.

examination showed a respiratory infection, a throat culture was taken. All streptococci recovered, whether from the regular surveys or from cases of illness, were grouped, and if group A were typed by Lancefield's methods. A Dick test was done on each man at the beginning and end of the study period.

During the period of the study, 42 cases of streptococcal infection developed in the company. This actually represented 40 men, since 2 men each had two infections at different times. The incidence of streptococcal disease among the total 131 men in the company was therefore 32 per cent. This figure is high, but it includes all

cases of streptococcal infection which occurred, no matter how mild. Actually, only 14 of the 42 cases were of sufficient severity to require bed care. Nevertheless, the fact is demonstrated that streptococcal infections may be much more widely spread than usual morbidity figures indicate.

In Table 1 are shown the various kinds of streptococcal illnesses which developed and the streptococcal types involved. Six different types were responsible for sickness in the study company, but of these types 6 and 1 were outstanding. Together they accounted for 30 of the 42 cases of infection. The remarkable point is that,

TABLE 2

Comparison of the Types of Streptococci Found Among Cases of Illness and Normal Carriers in the Study Company, Normal Carriers in Other Companies and Cases of Scarlet Fever

| Type of Streptococci | Percentage Distribution of Types among Streptococci Recovered from | | | |
|----------------------|--|----------------------------------|--------------------------------------|-----------------------------------|
| | Cases of Streptococcal Illness in Study Company | Normal Carriers in Study Company | Normal Carriers in 6 Other Companies | Cases of Scarlet Fever on Station |
| 1 | 21 | 24 | 20 | 5 |
| 3 | 10 | 9 | 3 | 55 |
| 5 | .. | 0.5 | .. | .. |
| 6 | 50 | 46 | 33 | .. |
| 11 | .. | 0.1 | .. | .. |
| 12 | 7 | 7 | 8 | 3 |
| 14 | .. | .. | 2 | .. |
| 19 | 10 | 7 | 17 | 37 |
| 25 | .. | 1 | .. | .. |
| 28 | .. | 0.5 | .. | .. |
| 32 | .. | 0.1 | .. | .. |
| 39 | 2 | 1 | 7 | .. |
| Not Typable | .. | 3 | 4 | .. |
| Total No. Strains | 42 | 637 | 428 | 38 |

No strains of types not included in table were isolated.

despite the large number of other streptococcal infections due to these two types, they caused no scarlet fever. The two cases of scarlet fever which did occur in the company were both due to type 3 streptococcus. This suggests that types 1 and 6, although highly pathogenic, may have only slight if any ability to produce scarlet fever.

More evidence on this point is available in Table 2, in which is given the percentage distribution of the different types among streptococci recovered from various sources on the station. The first point of interest in this table is that the percentage distribution of the various types of streptococci in the study company is the same among cases of illness and normal carriers. This confirms an observation we have previously made¹ in a study in an army camp that the incidence of disease due to a given type is proportional to its distribution among normal carriers. Furthermore, the distribution of the various types among normal carriers in six other companies on the station was practically the same as in the study company, so that the latter may be considered representative of conditions on the station as a whole. In all of the companies types 6 and 1 predominated. Nevertheless, among cases of scarlet fever occurring on the station, types 3 and 19 were outstanding. No cases of scarlet fever due to type 6 were discovered, and only two were caused by type 1. This is evidence that types 6 and 1 had negligible power to produce scarlet fever.

It seems, therefore, that the streptococci present on the station could be divided into two major kinds:

1. Types which were highly pathogenic but which had little scarlatinogenic ability, like types 1, 6, and 12.
2. Types which were pathogenic and scarlatinogenic, like types 3 and 19.

No reason has yet been discovered why some strains are scarlatinogenic and others not. Julia M. Coffey of the

Division of Laboratories and Research of the New York State Department of Health was kind enough to determine the toxigenic abilities of the four major strains encountered. Types 19 and 6, one scarlatinogenic and the other non-scarlatinal, each produced toxins of high potency, approximately 90,000 S.T.D. per ml. On the other hand, types 3 and 1, the former scarlatinogenic and the latter not, yielded toxins of only low titer, approximately 100 and 1,000 S.T.D. per ml, respectively. Even admitting that a laboratory test may not give a true indication of the ability of a strain to produce toxin under natural conditions, the fact remains that type 6, which produced no scarlet fever, possessed the ability to produce toxin of extremely high potency. It appears, therefore, that toxigenic ability alone does not determine the difference between a scarlatinal and a non-scarlatinal strain of streptococcus. This problem will need considerably more work before it is clarified.

During the period of the study throat cultures were taken on all normal persons in the study company at semi-weekly intervals. The carrier rates for the various types of streptococci recovered have been charted in Figure 1. Type 6 was the predominate strain; from 16 to 33 per cent of the men were carriers of this type. The second most common strain, type 1, showed carrier rates between 7 and 18 per cent. The three other outstanding types, 3, 19 and 12, averaged 5, 4 and 4 per cent respectively. When all types are considered the carrier rates ran as high as 69 per cent.

The striking point in these observations is the high carrier rates. Ordinarily in normal civilian populations the rates are not over 10 per cent, and even during epidemic times rarely exceed 40 per cent. But in this case, as high as 69 of every 100 individuals were carriers of streptococci and 66

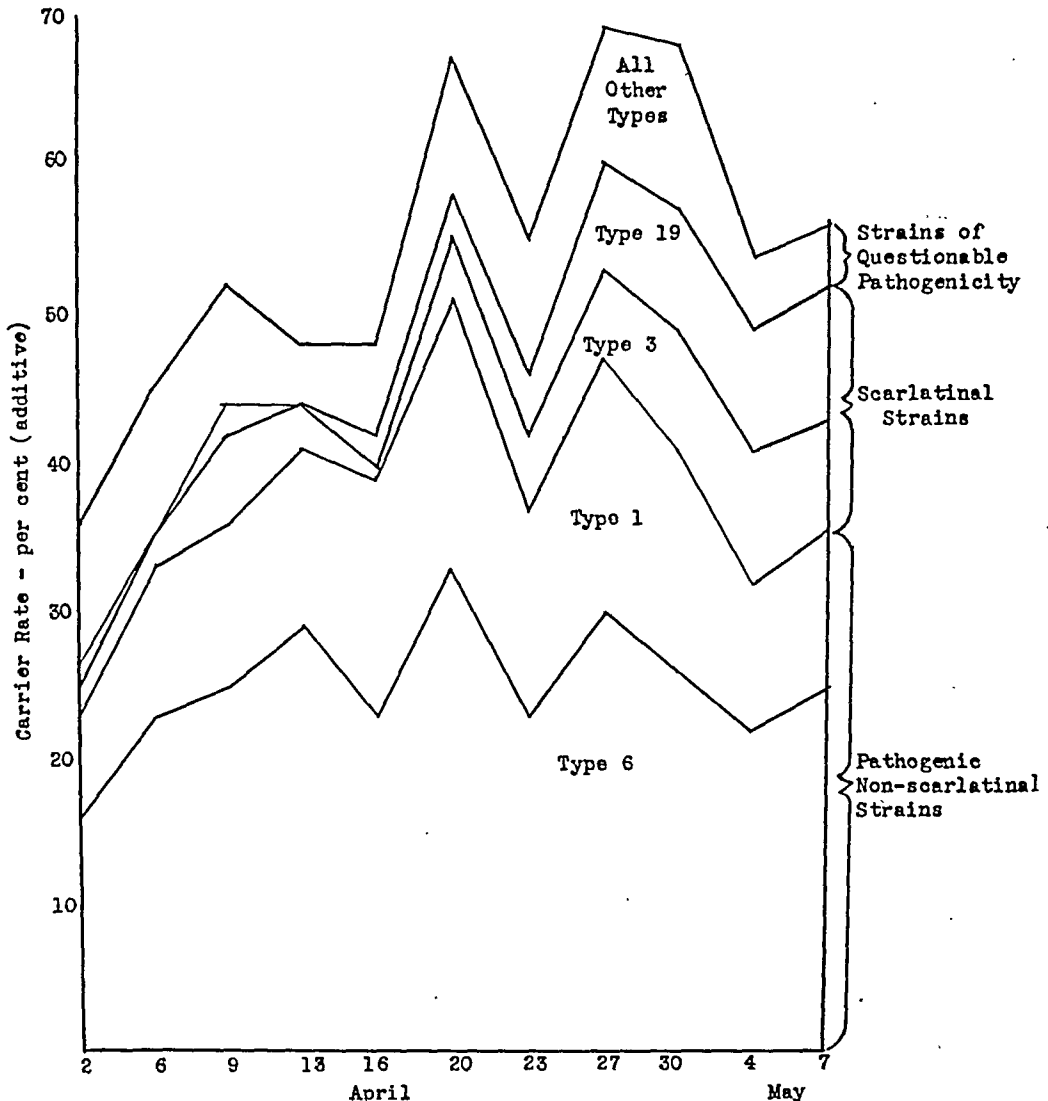


FIG. 1. THE COMPOSITION OF STREPTOCOCCAL CARRIER RATES IN THE STUDY COMPANY DURING THE PERIOD OF STUDY.

of these harbored strains of known pathogenicity.

These high carrier rates account for the high incidence of streptococcal infections in the study company. As previously mentioned, we have demonstrated in an earlier study¹ that during an epidemic of scarlet fever due to a single type the case incidence in various companies was proportional to the carrier rates for the type of strepto-

coccus causing the outbreak. In the present study, however, we have an outbreak due to a number of different types. If we plot the average carrier rate for each type during the study period against the case incidence of illness due to the respective type we find the relationship to be a straight line (Figure 2). This means that where more than one type of streptococcus is active during an outbreak, the number

of cases of infection due to each is proportional to the carrier rate for the respective type.

These high carrier rates apparently developed among the men during their course of training, since only 4 per cent of incoming inductees were found to harbor beta hemolytic streptococci.

The next phase of the study concerns the experiences of the individual men with the streptococci. Eighteen of the 131 men in the study company were never reached by the streptococcus, and therefore naturally developed no illness. From 113 men, streptococci were recovered by throat culture; in many instances two, three, and even five types were found in the same man during the study period. And yet only 40 men developed streptococcal illnesses. What protected the other 73 men definitely known to have streptococci in their throats from becoming sick? Time will not permit a full analysis of the observations on this point. They will be

made the subject of another report. The following are, however, the important points:

1. Seventy-three men developed no illness even though as many as five different types of streptococci of known pathogenicity were recovered from their throats.

2. The Dick reaction apparently played no rôle in this resistance, since the amount of illness among Dick negative men was proportionately the same as among those Dick positive.

3. Some individuals resisted infection with one type of streptococcus but became ill when seeded with another type.

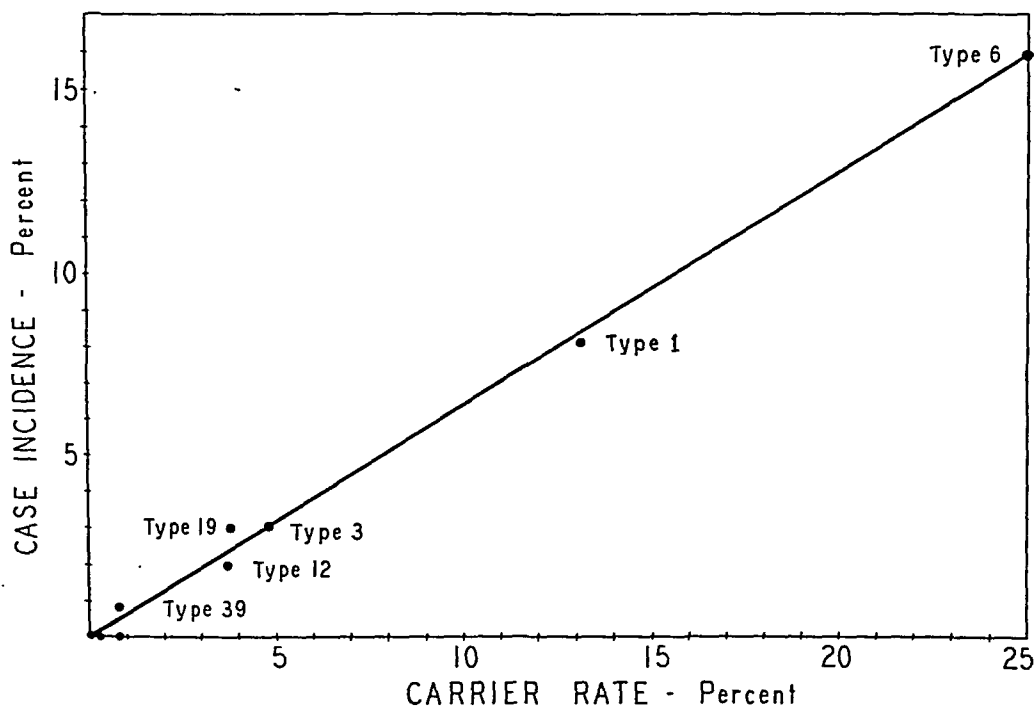
4. Several persons developed two illnesses due to two different types of streptococci.

5. No person became ill twice from the same type organism.

All of these observations point toward a conclusion that resistance to streptococcal infections is due, at least in part, to some form of type-specific immunity.

These studies have, therefore, pointed out two possible avenues of approach to the problem of preventing streptococcal infections at naval stations. First,

FIG. 2. The relationship between the percentage distribution of various types of streptococci among normal carriers and among cases of illness. Each dot represents a type of streptococcus



since the number of cases of illness is proportional to the distribution of streptococci among the men, steps aimed at preventing or inhibiting the dissemination of organisms should lower the number of infections. Studies in this direction are under way but as yet incomplete.

Second, since resistance to infection seems to be type-specific, it may be possible to develop a type-specific immunity to those types which are active on the station. Studies are therefore being made on the development of efficient type-specific vaccines. The method would not be applicable for universal use, but at stations where only a few types are responsible for the streptococcal illnesses, a pooled vaccine of these types, given to all incoming recruits, may prevent the bulk of the streptococcal disease. Our work in this direction is so far encouraging but awaits the test of trial during the coming winter.

And finally prophylaxis with sulfonamides should not be overlooked. Our previous report² on this subject has demonstrated that streptococcal epidemics may be controlled by the

administration of small doses of sulfonamides, and that the resultant drop in case rate holds for at least 3 weeks following discontinuance of the drug.

The prevention of streptococcal infections in the armed forces may not, at first glance, seem important except in those instances where a definite epidemic occurs. They are, however, constantly present, especially during the winter months, and although not reflected in the usual morbidity figures because of their general mildness, they account for a very appreciable figure in man-days lost.

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Laboratory Methods Used in Determining the Value of Sulfadiazine as a Mass Prophylactic Against Meningococcic Infections*

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THE purpose of this paper is to outline the laboratory methods used in evaluating the efficiency of the mass use of sulfadiazine as a prophylactic against meningococcic infections and to describe the laboratory studies that should be made before such treatment is instituted. As is generally known, meningococcic infections presented a considerable problem during the past winter in the various newly assembled Army camps in the southeastern United States. The control measures that have been used heretofore, such as isolation of patients, quarantining of units, and culturing of contacts had no noticeable effect upon the prevention of additional cases. It was shown that only rarely would the new cases occur among the contacts of diseased individuals. Sample surveys of military units where meningococcic infections were occurring indicated that a high carrier rate, with Group I carriers predominating, was present.

It was decided, after preliminary trials proved that small doses of sulfadiazine were effective in sterilizing meningococcus carriers,¹ to determine the efficiency of the mass use of this

drug for controlling meningococcic infection by the total elimination of carriers. A preliminary report concerning these studies has been rendered elsewhere.² This showed that the administration of small doses of sulfadiazine to an entire population *at one and the same time*, is the most effective means available for controlling meningococcic outbreaks in closed populations. The carrier rate is precipitously dropped to near-zero and this is immediately reflected in the case rates.

But who shall receive such treatment? As was mentioned before, the culturing and treating of case contacts is of little value. Even though sulfadiazine was found to be effective in eliminating carriers from an entire population by the mass prophylactic use of the drug, the measure should not be applied indiscriminately to large groups without first making a careful epidemiologic study. This should include determinations of the carrier rate, as well as of the serological types present. Our studies have shown that when epidemics of meningococcic infection occur, the following conditions are present: high carrier rates, predominance of Group I organisms, and the presence of non-immune (new recruits) individuals in the population. Table 1 summarizes the data collected from

* Presented before the Laboratory Section of the American Public Health Association at the Seventy-second Annual Meeting in New York, N. Y., October 12, 1943.

TABLE 1

Incidence and Types of Carriers in Relation to Susceptibles and the Occurrence of Cases

| Camp | Carriers Per cent | Groups (Per cent of Carriers) | | | | Cases | New Recruits |
|------|----------------------|----------------------------------|-----|------|-------|----------|-----------------|
| | | I | II | IIa | P-V * | | |
| A | 37.0 | 56.8 | 5.4 | 1.4 | 36.4 | Epidemic | Yes |
| B | 55.8 | 62.2 | 7.5 | 7.3 | 23.0 | Sporadic | No |
| C | 7.9 | 11.2 | 7.4 | 18.6 | 62.8 | No cases | No |

* Polyvalent meningococci

several camps and demonstrates the above conditions. Such data give one economic as well as epidemiologic justification for the treatment.

The description of the methods evolved from these studies forms the basis of this report. These methods have now been employed in 4,737 carrier and case cultures obtained during the past 9 months. Of this total, 1,692 were positive for meningococci (Table 2). Of the positive cultures, 800 were obtained from the blood and spinal fluids of actual cases of meningococcal infection. These were examined by the methods to be described, and form the basis for our acceptance of their worth. In no instance have we encountered an organism, actually isolated from a patient, which failed to type serologically or to yield the typical fermentation reactions. These results are a reflection of the vastly improved media (dehydrated) and typing sera available today. Although these procedures are relatively easy to apply, good results can only be obtained by well trained

personnel. One should take every opportunity to increase his efficiency by practising with known meningococcus cultures which have been mixed with ordinary throat cultures.

At this point it might be pertinent to define what we have called a meningococcus: a Gram-negative diplococcus which ferments dextrose and maltose but not sucrose, and which is agglutinated by polyvalent horse, anti-meningococcus serum but not normal horse serum or saline. Agglutination by monovalent rabbit serum is desirable but not necessary except for the requirements of specific type identification. We have encountered organisms in carriers but not in active cases which fulfil all of these criteria, except that they are agglutinated only by the polyvalent horse serum and not by monovalent rabbit (or chicken) sera. We call such organisms "polyvalent meningococci," and believe them to be deficient in capsular substance as might be expected in carriers.

Further, these organisms should not

TABLE 2

Summary of Positive Meningococcus Cultures Examined During a 9 Month Period at the Fourth Service Command Laboratory

| Source | Positive Cultures | Serological Groups | | | | Fermentation Reactions |
|---------------|----------------------|--------------------|-----|-----|-------|---------------------------|
| | | I | II | IIa | P-V * | |
| Spinal fluid | 579 | 559 | 4 | 16 | 0 | Typical |
| Blood | 221 | 200 | 10 | 11 | 0 | Typical |
| Nasopharynx † | 892 | 456 | 90 | 72 | 274 | Typical |
| Totals | 1,692 | 1,215 | 104 | 99 | 274 | |

* Polyvalent meningococci

† Carrier Surveys predominately

grow at room temperature but should require rather fastidious growth conditions such as enriched media and the diminished oxygen tension of the candle jar. We routinely include para-aminobenzoic acid in 5 mg. per cent concentration in all of our primary isolation media as a safeguard against sulfonamide treated patients.

METHODS

1. *Culture media:*

a. *Chocolate Agar:* This is a mixture of dehydrated hemoglobin (Difco) and Proteose No. 3 Agar (Difco) made according to the instructions of the manufacturer³ except for the addition of 50 mg. of para-aminobenzoic acid per liter.

These plates should be incubated for 24 hours following their pouring, and those with contaminating colonies discarded. The plates should be moist but not wet. If too moist, difficulties with contaminants such as proteus may be pronounced. They should be warm when inoculated; following this, they are transferred to candle jars and incubated at 37.5°C. Chilling must be prevented. Many of our surveys were done under field conditions but the plates were kept warm by wrapping with blankets.

b. *Fermentation Medium:* The medium to be described has been found extremely effective for both meningococci and gonococci. Reactions may usually be read in 12 hours or less for the former, while the latter may require 48 hours. Spinal fluids may be inoculated directly into this medium. Because of its agar content, the oxygen content is kept low enough so that incubation in the candle jar is usually unnecessary. We employ three sugars routinely: dextrose, maltose, and sucrose. An occasional meningococcus will ferment dextrose or maltose slowly but all have eventually fermented both. Sucrose fermentation has not been encountered in our series.

Formula

| | |
|-------------------------------|-------------------------------|
| Bacto-tryptose | 20 gm. |
| NaCl | 5 gm. |
| Agar | 1 gm. |
| Phenol red | 0.4 ml. (0.2% stock solution) |
| Distilled H ₂ O to | 1,000 ml. |

Adjust to pH 7.4.

Add 5 gm. of dextrose or maltose or sucrose to 1 liter of medium. Sterilize for not more than 10 minutes at 10 lb. of pressure.

The consistency of the fermentation reactions obtained with this medium clearly establishes them as valuable adjuncts for the final identification of *Neisseria*.

c. *Serological Typing:* Quellung⁴ reactions are not feasible in carrier surveys. The spot-plate method to be described is rapid, accurate, and economical. It was run in parallel with the macroscopic tube agglutination for several hundred specimens and no discrepancies were encountered. We have used it for both our case and carrier cultures.

Serum: Typing and control sera diluted 1:10 with normal saline are employed.

Suspension: The surface of a plate containing a pure growth (by Gram-stain) of the organism to be tested is wiped with a cotton swab. This is then plunged into a small tube containing about 0.5 ml. to 1 ml. of normal saline, and twirled until a smooth, fairly dense suspension of organisms results.

Test: Several circles are marked with a china pencil on a large glass slide. One drop of each of the sera is placed in its circle. A drop of the suspension is added, and complete mixing is accomplished by stirring with a toothpick. The slide is then rotated gently for 15-30 seconds. Agglutination is read macroscopically, preferably by indirect illumination against a dark background. Final readings should be made before there is any sign of drying. Agglutination is readily observed when present.

If an organism agglutinates in all the sera, then, providing that a pure culture

has been used, it is probably not a meningococcus. However, an occasional meningococcus may be "serum-sensitive." These should be replated and retested the following day. Contaminated cultures which give improper agglutinations may be purified in this way. By that time, also, the fermentation reactions will have been completed and further indication of its identity will have been obtained.

Approximately three hundred organisms were typed in duplicate by the spot-plate method with both rabbit and chicken⁵ sera.* In no instance was any disagreement noted between the two. Those organisms which were agglutinated by polyvalent horse serum but not monovalent rabbit serum were also not agglutinated by chicken serum. It is our belief that the rabbit and chicken sera may be used interchangeably.

d. *Routine for Carrier Surveys:* A curved wire swab, which has been slightly moistened with a few drops of broth, is passed up and behind the uvula and the posterior nasopharynx is wiped gently. This swab is then removed without touching the tonsils or the buccal linings, and is streaked across one-eighth the surface of a chocolate-agar plate. The wire swab is discarded. Using a fresh sterile, wooden swab or a platinum needle the remainder of the plate is streaked from one contact with the original streak. The plate is then transferred to a candle jar and incubated for 18-24 hours.

Following this period of incubation, the plate is removed and searched for suspicious colonies. These will ordinarily be seen in the secondarily-streaked area as moderate-sized colonies somewhat opaque, moist, soft, and easily emulsifiable. They may be completely clear. Three or four suspicious colonies are picked to a "pie-plate"

(another chocolate plate which has been divided into four or eight parts). This increases the chances of finding multiple types in a single carrier. We have isolated two types from one carrier on several occasions. It cannot be emphasized too strongly that the examiner should practice such isolations with known cultures on every possible occasion. One can easily double the percentage of his positive findings as the result of practice. The "pie-plates" are placed in the candle jar and incubated at 37.5°C. for 24 hours; at the end of this time they are removed and examined for purity. If they are pure cultures of Gram-negative diplococci, they are inoculated into sugars, and also agglutinated by the method previously described. The sugars will usually be completed within 12 hours. An occasional organism will ferment either dextrose or maltose slowly, and these may require slightly longer incubation.

It must be borne in mind that the meningococcus grows very profusely on this medium and produces colonies of fairly large size. This is sharply contrasted with the gonococcus which grows much slower and produces colonies which are much finer.

Some carriers will present what looks like pure cultures of meningococci, but one must guard against the tiny, *Hemophilus* colonies which may unnoticeably be transferred with the *Neisseria*.

We have not employed the oxidase⁶ reagent on a wide scale since it was felt that with experience one could pick suspicious colonies with considerable accuracy, and therefore it was not necessary to use this reaction.

Utilizing the methods described, one may do fairly large scale studies on an accurate basis without too much difficulty. If one desires, the fermentation reactions can be omitted and final identification can be made on the basis of serological reactions. However, fermentation reactions should be deter-

* Supplied through the courtesy of Dr. W. V. Verwey of Sharpe and Dohme, Inc.

mined whenever there is any doubt concerning a given culture.

In closing, we would like to stress again that, before chemo-prophylaxis is employed on a large scale for a given group, a survey along the lines indicated in this paper should be made if proper laboratory facilities are available. The fact that one or two cases occur in a certain group is by itself, insufficient ground for wholesale distribution of sulfadiazine. A proper survey will help to indicate the probability of future cases and, therefore, the necessity for chemo-prophylaxis.

CONCLUSIONS

1. A routine which employs dehydrated media, a simple candle jar, and a rapid serological technic has been described for facilitating studies for meningococcus carriers.

2. The relationship of meningococcus carrier surveys to the mass treatment of such carriers with sulfadiazine as a method for controlling epidemics of this disease has been stressed.

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MEDICAL CARE MUST BE COMPLEMENTED BY PUBLIC HEALTH MEASURES

IN Congressional, sociological, medical, and public health circles there continues to be a lot of discussion of the medical aspects of the Wagner-Murray Bill which, according to its proponents would make good medical care freely available and according to its opponents would play havoc with medicine and medical care. Be that as it may, there seems some possibility that the medical features of this bill may be passed by the Congress for want of something better; and passage is rather likely if an increase in the rate of social security pay roll deductions is adopted as an anti-inflation measure.

Most thoughtful people agree that it would be unsound, as a public policy, to mix social security legislation and anti-inflation measures, even though this might at the moment seem expedient and popular. But suppose that in spite of this objection and regardless of the grave apprehensions many have about the medical aspects of the bill, it should be passed and really did provide a decent and extensive medical service. Even this would get the medical profession and the public no further forward than medical care of the individual if, as, when, and after he becomes sick; and this is not enough. Care of the sick is only a half measure, and in any planning for the health of the farmer in the field and the industrial worker in the factory, medical care must be buttressed with or complemented by a public health program sufficiently great in its scope and intensive enough to bring to the people of all communities the full benefits of preventive measures. It follows then that if the Wagner-Murray Bill or some other bill should be passed, or even if no bill at all is passed, there must in any event be a thumping increase in the amount which the public pays for the maintenance of its health.

To expect health agencies, operating on present miserable appropriations, to bring to the people the full benefits of modern science is to expect the impossible; and health administrators will be rendering no service to their cause or to the people for whose health they are responsible if they remain satisfied to act the rôle of remittance men. The time has come, or rather it came some years ago, when health officers need to say boldly that it costs real money to do decent public

health work, that the budget for a properly operating health program is not just an infinitesimal part of government expense. Probably one of the reasons why health department budgets are so small is that each health officer has emphasized to his appropriating body how little he asks in comparison with education, roads, parks, police, fire, etc. These more robust elements of government could employ the same argument if they were willing to conduct their activities on a nineteenth century scale. But they are not willing to do this, and they do get the funds. In the rough and tumble of affairs, humbleness is not normal nor is it either admirable or result-attaining.

It would seem well to state here that this emphasis on the urgent necessity of provisions for a substantial increase in appropriations for public health work does not arise from any tendency to deprecate the importance of the care of the sick; nor does it arise as part of an argument that prevention may entirely replace cure. Beyond a doubt, the world will always have its sick and probably some poor, in spite of all that science or society may do, and if one is realistic, this must be accepted. But with each succeeding generation there has been and there should continue to be an increase in the possibilities of prevention through public health measures, and from the standpoint of economy in time, money, and suffering, measures of this sort must be continually explored, expanded, and applied in association with service designed to care for the sick.

Now it has been suggested that there be included in the Wagner-Murray Bill (just in case it should pass) a provision that would insure reasonably adequate and specifically designated funds for state-aid in public health work, say some ten per cent of that amount which would be set aside for medical and hospital care. No one knows exactly how much the total Medical Care and Hospitalization Account would be, under this bill, but it is reasonably safe to say that ten per cent of it would loom large in comparison with present federal expenditures for public health purposes. Unfortunately it would not seem practicable to put this suggestion into effect, for funds raised under social security are contributed funds, ear-marked for the benefit of those who contributed them. Such funds could not be used for an over-all benefit to all the people of the nation unless all the people contributed, and the Wagner-Murray Bill does not propose that every person contribute. Such an impasse, however, does not offset the soundness of the proposition that medical care without adequate provision for public health programs would be but a half measure, and if this concept were to be accepted by Congress, its members could find ways and means.

In effect then this may be said: The Wagner-Murray Bill is alarming in its social implications. It has much that is sound in its medical provisions but at the same time contains many positive and negative deficiencies. We should be unhappy to see it pass in its present form, but if it is to be passed there should be made whatever adjustment is necessary in order to set aside from its derived funds a proportion sufficient to insure effective public health programs; and the proportion necessary to achieve this would be no mere pittance.

THE PUBLIC'S FOOT

ONE of the difficulties in getting people to take action in any given direction is that human beings are almost certain to miss the significance of a simple declarative sentence, or of a routine happening. To catch attention there must

be some emphasis by tone or inflection or accent or play on words, or some drama or association, or climax. In contrast to a flat declaration, consider the statement that "An army marches on its stomach." Here there is association between this truth in metaphor and the somewhat ridiculous mental picture that it creates. From this association comes remembrance, and remembering, one ponders. But if the statement is "The public walks on its feet," or if the observer notes that this is so, the listener or reader or observer is unimpressed. The information obtained is not news, nor is it dramatically presented. It appeals neither to the esthetic nor the intellectual, and it fails to arouse either sympathy or afterthought.

Even if "The public walks on its feet" is an unimpressive statement, the fact that man does so walk, rather than on feet and hands, has created a far-reaching public health problem. For though structurally and functionally the foot is an amazing mechanism, it is not yet completely adapted to the erect posture. Nor is the bony skeleton of one person's feet so exactly like another's, or the amount and distribution of downward pressure so much the same that, proper width and breadth assured, the ordinary stock shoes are suitable for all people. The net result of these various contributing factors is foot trouble for a large proportion of the public, just what proportion it is hard to say. No hard, cold, reliable data are available on this point, but common observation indicates that more than a majority of adults have one or another kind of foot pain, weakness, or impairment. If this were not so, bedroom slippers would not always be shown in pictures of the tired business man, relaxed at home. And if uncomfortable feet were not a part of woman's cross, there would be lots less pawing around for shoes in the dark of the moving picture theater.

It may fairly be said then, that foot discomfort and partial disability are relatively highly prevalent. At the same time it must be confessed that there are few places to which the foot sufferer may turn with any assurance of relief. Foot troubles do not kill, nor are they as a rule completely disabling, and the medical profession and public health workers are not inclined to give much thought to a disability which does neither of these things. Apparently the subject is beneath the notice of the high-powered orthopedist, and he will have none of it. Give him something that involves fractures, stiff joints, deformities, plaster casts and the adjustments of muscles, and he is your man; but go to the same orthopedist with nothing more serious, from his standpoint, than a callous, and he is not likely to be interested, and not assuredly competent. The average physician, for his part, lacks fundamental knowledge as to the complicated functional anatomy of the foot. He is not, therefore, in position to bring relief to the patient, and ends up by referring her or him to a shoe store or a chiropodist. This is not to suggest that physicians undertake the routine trimming of toenails or the cutting of corns. But it does seem worth emphasizing that pedal disabilities constitute a vast problem and a correspondingly vast demand for relief, and that since the medical profession is not meeting this demand, these sufferers are seeking aid and comfort in other directions. They thus create public support and, in some instances, legislative backing of those who, from the medical standpoint, must be regarded as irregulars and sub-professional, and therefore not a group to be encouraged. And, more important from the sufferer's standpoint, he gets only temporary relief, as a rule.

Another deterrent to serious consideration of the foot is that at its best, and even with red toenails, it is not a thing of which poets often write: of the ankle (female) yes; of the curve of the calf (female), higher and higher praise; but of

the foot, male or female, no. This is understandable, for to the casual observer, the foot is but a slewed-out, battercake-like extremity, with over-riding toes and a strong tendency to corns, callouses, and bunions. And so to the world at large the foot is not an inspiring subject and, unlike syphilis, has not been adopted by fashionable society as a drawing room topic. Each dowager and smart young matron tends to regard her own foot pains as personal, a bit on the vulgar side. Obviously, if the woman of leisure does not feel that this is a dilemma from which she must deliver her lesser sisters, the lesser sisters must continue to suffer surreptitiously, and so with the butcher, the baker, and the policeman on his beat. Not until these foot sufferers become as vocal and clamorous and objectionable as a militant minority, though they are not a minority, will the medical profession be moved to find an answer.

In spite of all these things, a few physicians have undertaken serious study of the comparative anatomy of the foot, of its evolution, its mechanics, of the effect of the erect posture and the pull of gravity on and through the foot. As nearly as can be gathered, these men have established relatively simple diagnostic procedures and quite effective therapy. Apparently, however, their pleas that the medical profession adopt a different attitude in regard to foot troubles, that it inform itself, and that it exercise modern diagnosis and therapy have fallen on deaf ears. And the suggestion that foot troubles constitute a public health problem is likely to strike horror in the hearts of the virus worker, the nutritionist, the administrator, the epidemiologist, unless they happen themselves to have some personal experiences along this line. But let it not be forgotten that the high incidence of a minor and lowly disability may constitute a more serious public health problem than does some aristocratic but comparatively rare disease.

Credit Lines

IT was a simple matter for the Editors to decide that this issue of Credit Lines would be devoted to the Association's Wartime Conference and 72nd Annual Business Meeting and Meetings of Related Organizations held in New York City, October 11 to 14. It was another thing to agree on where to begin and what to select for mention from among the events and personalities which together made an engrossing week.

It seemed safe to start with the delegates, who, after all, are the most important part of a convention. There were so many of them, 3,603 to be exact, that programs ran out by Tuesday noon and a supplementary mimeographed edition, done overnight, melted entirely away before lunchtime on Wednesday. This largest registration in the Association's history was solid-pack, professional public health workers, with little dilution by wives and guests. It may well have historic importance, if it is, as we believe, the largest number of professional public health workers that has ever come together anywhere in the world at any time. A claim to a "Famous First" is always immediately challenged, so we are guarded in making that statement. If anyone knows of a larger meeting—of professional public health workers now—we should like to be reminded of it. The American Health Congress, held in Atlantic City, N. J., in 1926, will not be accepted as a rival. While the attendance there was well over 6,000, the members of the American Nurses Association were largely responsible for it, so that does not count.

First and full credit, then, goes to the 3,603 delegates for good-naturedly accepting a program-less registration,

crowded meeting rooms, accommodations in hotels whose names they never heard of before, when the Pennsylvania, New Yorker and other nearby places were packed to the gunwales, and, most of all, for making the effort to come. They got their money's worth, thanks to the Program Committee who wrote the play and provided the actors, and to the New York Local Committee who produced it.

The production end of an operation as extensive and involved as an Association meeting isn't done with one hand tied behind the Chairman's back, nor with mirrors. Dr. Ernest L. Stebbins, as General Chairman of the Local Committee, and his subcommittees on Finance, Reception, Meeting Rooms, Radio, and Publicity, had their collective hands full. The real test of the effectiveness of the producing job is keeping secret from as many delegates as possible how much work is done before the curtain goes up and how much is done backstage while the performance is going on. Dr. Stebbins, Mr. Frank Kiernan, Dr. John L. Rice, Dr. John Oberwager, Dr. Iago Galdston and Dr. Frank Calderone, Chairmen in that order of the subcommittees named above, kept the secret well.

The Finance Committee raised the money to do all the things for which money was necessary. Only Lend-Lease Administration could afford to pay on a dollars-and-cents basis for the many work-hours contributed to the Conference by members and friends of the Association in and around New York. The Meeting Rooms Committee kept the Section Officers and the speakers happy, no small responsibility. The Reception Committee made everybody happy. The Publicity Committee, by

dint of superhuman effort, succeeded in drawing in more abstracts of papers than were ever acquired before, and by so doing, giving the local and national press more material to work with than ever before. By the way, a limited number of sets of abstracts were collated by the Publicity Committee in winding up its affairs. They may be obtained, (as long as they last) on request to the Central Office. The committee developed its work plan under the slogan "Health Is Global," and its initial effort was to gather in statements on this theme from state and territorial health officers, from many Latin American health leaders, and from the ministries of health of our Allies. These air-mailed, wired, and cabled responses are eminently quotable. They have been mimeographed as well and are included in the abstract packet.

The Radio Committee was responsible for the Association's first connection with a program as notable as America's Town Meeting of the Air, with its millions of Thursday night listeners. Debating the question "Are Local Health Services a Responsibility of the Federal Government?" Dr. Abel Wolman and Dr. Nathan Sinai, for the affirmative, and Dr. H. H. Bauckus and Mr. E. A. Van Steenwyck for the negative, provided several hundred Wartime Conference delegates, who attended the broadcast in Town Hall, and large numbers of Association members at their radios at home with an entertaining and thought-provoking hour. This was one of three coast-to-coast broadcasts. The other two were sent by short-wave as well to Latin America. The dramatization, "The Battle for Health," written by Mr. Irve Tunick for the Association, will be published in the January JOURNAL. It is offered for re-use by public health workers in whole or in part without restriction.

Credit Lines would be ungracious if it did not bow in the direction of the

Pennsylvania Hotel in acknowledgment of excellent service in spite of man power shortages and wartime restrictions.

The Program Committee, consisting of a small central group selected for over-all knowledge of and experience in public health and the Secretaries of the Sections, who, of course, represent special interests, was wholly responsible for the scientific content of the War-time Conference. The fact that it was planning a program on wartime public health was not forgotten for a moment and the finished product of 176 papers and reports presented in 50 sessions turned out to be almost an encyclopedia of what the public health worker is doing, or at least should be doing, to meet problems posed by the war.

The play's the thing, perhaps, but as was mentioned before, the audience is important too, and the sustained interest of the delegates was nothing short of amazing. The final sessions on Thursday afternoon were as well attended as those in the early part of the week. One session on the last afternoon continued until 6 o'clock with not a rustle of impatience or an indication of saturation from the audience. Another at the same time went far beyond the usual 4:30 closing, with every one of the 450 chairs occupied and perhaps 200 persons standing or sitting on the floor. This was a special session entitled "The Evolving Pattern of Tomorrow's Health" where imaginative and exciting post-war planning was done with regard to housing, hemispheric coöperation, education, and health department responsibilities.

All the special sessions were high spots and there is evidence that many people are anticipating their publication in the JOURNAL as symposia. One on "Current Health Department Problems in War," under the leadership of Dr. Huntington Williams, used personnel shortages as a point of de-

parture. It was a panel session and by agreement no formal papers were prepared. Those papers describing "New Ventures Toward Health Security" and "Public Health Implications of Tropical and Imported Diseases" are awaiting the attention of the Editorial Staff. Four of the five papers comprising the post-war planning session appear in this issue.

There were interesting innovations in the technic of program building. Dr. Edmund K. Kline, Secretary of the Laboratory Section, experimented successfully with a session of what he called "abridged papers" under the title "What Is Happening in the Laboratory Field." In two and one-half hours, a large audience had the opportunity to hear 12 short papers, 5 to 7 minutes' presentation time, on as many subjects. A condition to being given a place on the program was the preparation of a full length manuscript for possible publication in the JOURNAL.

The new Section on School Health, in coöperation with the Food and Nutrition Section and the American School Health Association, sponsored a Workshop on "Adjustments of School Health Personnel in Wartime." Registration was requested in advance, admission was by card only, and the deliberately-chosen small meeting rooms with seating capacity of 50 assured the limitation of the size of the three groups. In an all day session, they attacked their problem as it relates to the rural, medium-size, and large community. The Maternal and Child Health Section, with support from the Food and Nutrition, Public Health Nursing, and School Health Sections, tried the Workshop idea, too, on problems connected with day care of children, with participants similarly limited as to numbers and self-divided according to their own interests, in state, large city, and small city groups.

The School Health Section, being

new, without committees and without commitments, used its Workshop as a device to determine its plan of work for the coming year. Since what could be done was so vast in its possibilities, focal points needed to be established. Dr. Leona Baumgartner, Chairman, and Dr. George M. Wheatley, Secretary, described the result as the emergence of islands here and there upon which school health people could scramble, look around a bit, and make up their minds what to do next. Task forces will carry out the decisions reached during the months ahead.

One could dip into the Section programs anywhere and come up with a nugget, as the JOURNAL will prove month after month as it brings the papers and reports to its readers. Meetings of related organizations held on Monday, October 11, were noteworthy, especially the symposium on cancer. It must be recorded that the first announcement of the dramatic results following the use of penicillin in syphilis was made at a meeting of the Epidemiology Section on October 14. Another good story, although it does not represent a world-premiere, was the use of penicillin in gonorrhea, read at the same session. Both papers, by Dr. John F. Mahoney, *et al.*, appear in this JOURNAL. In the January number, one or more of the contributions to a symposium sponsored by the Oral Health Group, now the Section on Dental Health, on Post-war Implications of Fluorine and Dental Health will be published. Immediately ahead, too, is Earnest Boyce's "Objectives in the Programming of Post-war Sanitation Work" which was part of a symposium arranged by the Engineering Section on post-war opportunities and responsibilities of the sanitary engineer. The Food and Nutrition Section has a reserve of excellent papers which the Editorial Board will find it difficult to put in any pub-

lication order, and this is true of all the Sections.

Streamlined as the Conference was, and without entertainment, social features, inspection trips, and other pleasant adjuncts to the real business at hand, there was neither time nor opportunity for the many breakfasts, luncheons, and dinners which have characterized Association meetings in the past. All alumni get-togethers were discouraged, for example, and reluctantly but in realistic answer to the question "What wartime significance does this have?" the Annual Banquet was omitted. There was one exception to the prohibition against purely social functions, and as if to make up for their lack, this was enthusiastically entered into. The Public Health Association of New York City sponsored the Reception to the President, President-elect, and Distinguished Guests which followed the opening General Session on Tuesday evening, and, aided and abetted by the Reception Committee, demonstrated a unique method of getting everybody acquainted with a minimum of formality and waste motion. The receiving line was dispensed with. Instead, great placards at intervals around the reception room announced that here were temporary headquarters for the Association Officers and Distinguished Guests; there the Public Health Association of New York City would receive; yonder were the representatives of State Health Departments—New Jersey, New York, and Connecticut; across the way stood the National Health Honor Roll Health Officers, and in the far corner the folks from the New York City Health Department. It was thus made easy for delegates to seek out the people they wished to see. After an interlude of hand-shaking and conversation, refreshments were served through the courtesy of the Lily-Tulip Cup Corporation. Door prizes were awarded and there was spirited compe-

tition among several quartets made up on the spur of the moment. They were singing not for their suppers but for a quartet of War Bonds. The winners, to the satisfaction of everyone with the possible exception of the unsuccessful aspirants, were six, yes six, young people from the Latin-American delegation. No one knew how the quartet became a sextet, but it did, and six War Bonds were eventually delivered by the generous hosts.

The Opening General Session itself was made memorable by the color of Mayor Fiorello H. LaGuardia in his address on Post-war Public Health, by the thoughtful Presidential Address of Dr. Felix J. Underwood, and by the presentation of the Sedgwick Memorial Medal to Brigadier General James Stevens Simmons, M.C. Dr. Underwood chose to speak on "Planning Today for Public Health Administration Tomorrow," and the paper is published in this issue.

For the third successive year, the Association's Annual Meeting was enriched by the presence of a number of representatives of Latin-American countries. Their attendance made possible by the Pan American Sanitary Bureau and the Office of the Coördinator of Inter-American Affairs, and a few coming as direct emissaries of their own governments, 68 of our friends to the south were present. Predominant among them were those with health education and laboratory interests. It will be recalled that administrative health officers were most numerous in the group that came to us in 1940, while last year engineers were in the majority. On the general program, delegates had the privilege of hearing Dr. Hernan Romero, Director, School of Public Health and Professor of Preventive Medicine and Hygiene, School of Medicine, University of Chile, Santiago; Dr. Felix Hurtado, Undersecretary of Health, Havana, Cuba; Dr.

Mario Pizzi of Chile; and Dr. G. H. de Paula Souza of Sao Paulo, Brazil. Through the good offices of Dr. Hugh S. Cumming and Dr. A. A. Moll, a special evening program was arranged where a number of papers on health problems and progress in several Central and South American countries were presented. While this was well attended, the real tribute to these visitors was paid by the Association on the occasion of the Second General Session. This was the only luncheon meeting of the Conference and it was attended by more than 500. Professor C.-E. A. Winslow, as spokesman, graciously and sincerely expressed the Association's "Welcome to Our Public Health Colleagues from the Americas." At the luncheon, too, forty year membership certificates were presented by Dr. Freeman to Dr. John F. Anderson, Mr. Wellington Donaldson, and Professor Irving Fisher, and the Health Officers of the communities on the National Health Honor Roll for 1942 were recognized.

The Health Education Center, conducted by the National Publicity Council for Health and Welfare Services for the Association, provided many educators-in-search-of-ideas with just what they were after. The Center was not a place for casual on-lookers. It was a spot where people stopped to look for a minute and hours later they were still there, wrapt, with portfolios piled high around them, and their own notebooks bulging. Mrs. Sallie Everson Bright and her colleagues turned the Center inside out to give the customers what they wanted.

And there was the Motion Picture Theatre with Mr. Thomas C. Stowell the impresario. And there were technical and a very limited number of scientific exhibits, crowded into small space necessarily, but still large in their implications of usefulness to public health workers.

The Association's exhibit of health

books of all publishers reappeared after an absence of several years. Conducted for the Association by the National Health Library, it presented nearly 500 recent books for the inspection of delegates. Featured was a "Five-Foot Shelf of Basic Books for Health Workers" compiled by the National Health Library Committee with the advice of the Secretaries of the Sections. Each Secretary was asked "If you were required to practise your specialty with only one book, what would you choose to work with?" In some instances one text was named; in others, any one book was declared inadequate and several were named as essential. Every Section Secretary contributed something to the Five-Foot Shelf, and the Library Committee made the final selections, after a period of firing the same question at all visitors to 1790 Broadway who would listen. No one reminded the committee of G. K. Chesterton's famous reply to the familiar question "If you were shipwrecked on a desert island, what book, etc." It was, you will remember, *Thomas' Guide to Practical Boat-Building*. The Shelf interested so many delegates that they carried away more than one thousand copies of a leaflet in which the titles of the books displayed thereon were printed. The few copies remaining will be mailed to those who request them.

What about a meeting next year? The question was asked many times with an inflection that indicated no doubt on the part of anyone that one should be held. But the Executive Board will decide that when it meets on January 28.

"WHERE DO WE STAND?"

This is the question prompted by any resident of the 135 communities which are represented in the 60 charts recently issued in a booklet by the Committee on Administrative Practice of the

American Public Health Association, under the title "Health Practice Indices." Proportion of tuberculosis cases reported in the minimal stage, births in hospitals, infants under nursing supervision, syphilis contacts examined, immunization of children under 2 years of age, pasteurized milk, satisfactory water supplies, budgets of health departments. These are samples of the practices which are graphically presented showing where each community stands in the array. The data were taken from the *Evaluation Schedules* presented for the National Health Honor Roll for the years 1941 and 1942. The names of communities are not shown, but any health officer represented can determine from his own data just where he stands in the country-wide array.

This is probably the first time that a widespread picture of detailed health practices in the United States has ever appeared in print. The pamphlet is intriguing. It is bound to create not only widespread interest, but should serve as a strong stimulus to do a better job. We are indebted to George T. Palmer, Dr.P.H., the Chairman of the Subcommittee on Manual and Appraisal of Local Health Work, and Mrs. Erminie Cross Lacey of the Commonwealth Fund, who was responsible for the tabulations and charting.

A COURSE OF STUDY IN HEALTH FOR BOSTON'S PAROCHIAL SCHOOLS

The Catholic Archdiocese of Boston has published a course of study in health for grades 1 to 8 which was prepared by the Boston Health Department and the schools of the Archdiocese. Among the members of the Committee on School Health Services are Charles F. Wilinsky, M.D., Deputy Commissioner of Health of Boston and Superintendent of Beth Israel Hospital; G. Lynde Gately, M.D., M.P.H., Commissioner of Health of Boston; and

Clair E. Turner, Dr.P.H., of the Department of Public Health of Massachusetts Institute of Technology.

The significance of this coöperative venture between the health department staff and the parochial schools is even greater than the excellent content of the volume, since it may well provide a pattern for health education in other areas.

WORTH ACQUIRING

The September, 1943, issue of *Channels*, publication of the National Publicity Council for Health and Welfare Services, Inc., 130 East 22nd St., New York, N. Y., for its article on "What's Ahead in Health Education" sub-titled "A Glimpse of Current and Coming Events and Materials"; also for the article "Organize the Story for Labor" which tells how to work through labor unions.

The first 1944 calendar we have seen, distributed with the "Compliments of the New York State Department of Health, Division of Public Health Education," Edward S. Godfrey, Jr., M.D., Commissioner, and Burt R. Rickards, Director. Safety—Yesterday and Today is its theme. Colorful, quaint, amusing, sometimes nostalgic, and altogether delightful, no one will relegate this to the waste-basket.

"Post-War Construction," a program adopted by the Board of Directors of the American Society of Civil Engineers, 33 West 39th St., New York, N. Y., which includes housing. Brief and concise and interesting because it presents a program of immediate planning, starting from where we are and not geared to the brave new world our national advertisers have dreamed up for us.

"Selection and Training of Volunteers in Child Care," published by the Children's Bureau, Washington, D. C. A partial solution of the problem of personnel shortages in nursing, teaching, social work, and health education.

The October 4 issue of *Life* for its ten page discussion of the essentials of nutrition and what must be done to achieve a balanced diet for the whole world.

"Standards for Neighborhood Recreation Areas and Facilities," National Recreation Association, 315 Fourth

Avenue, New York, N. Y. You can check how your community stands with relation to the standard space requirement of one acre of neighborhood playground space for each 800 of the population, a community recreation building for at least every 20,000 of the population and other things.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

Mind, Medicine and Man—By Gregory Zilboorg. New York: Harcourt Brace, 1943. 344 pp. Price, \$3.50.

Mind, Medicine, and Man, is an original and provocative book. It is original in the sense that it is laden with the author's personal and unique interpretations and pleas. It is provocative in the sense that many of the author's interpretations elicit numerous questions and strong dissent.

The most satisfactory chapters of the book are those entitled "Instincts and Their Manifestations," "Normal Neuroses and Personality," "Certain Aspects of Mental Illness," and "Theories and Practice." In these chapters the author restates, frequently very aptly, the basic theories and principles of psychoanalytic psychiatry. Here, with profit, the author works over well cultivated ground. The preceding chapter "On Certain Misconceptions," and those that follow "Civilization and the Social Sciences," "Varieties of Human Aggression," "Crime and Judgment," and "Psyche, Soul, and Religion" constitute the author's "dicta" on a variety of subjects, principally on sociology, anthropology, criminology and law, and religion.

It is not possible in the space of a review to elaborate the questions and dissents which these portions of the book evoke. A few general comments must suffice. Dr. Zilboorg is evidently a man of wide knowledge, but his erudition frequently encumbers his exposition. He is at times guilty of overstatement, and of strong affirmation, where only tentative suggestion is war-

ranted. He does poor justice to Jung and none at all to Adolf Meyer. He is at times careless in his statements on medical history.

Nonetheless this work can be read with profit, precisely perhaps because it is so provocative.

IAGO GALDSTON

Rehabilitation of the Tuberculous—By H. A. Pattison, M.D., F.A.C.P. Livingston, N. Y.: Livingston Press, 1942. 186 pp. Price, \$2.50.

Public health workers as a group are not leaders in the field of rehabilitation. This volume is significant partly because the author, after a varied background of public health experience, has published a review of what we know about rehabilitating the tuberculous, and it can be read with profit by anybody. The volume includes a review of the problems underlying rehabilitation and, in Part 2, an account of in-sanatorium work, together with accounts of the programs in 18 rehabilitation centers in the United States and abroad.

As a point of departure for post-war planning, this book can be widely useful. It might open the eyes of other readers as it has opened the eyes of this reviewer. REGINALD M. ATWATER

Essays in Biology—In Honor of Herbert M. Evans. Los Angeles: University of California Press, 1943. 687 pp. Price, \$10.00.

This beautifully printed and elegantly bound volume was prepared in honor of Herbert McLean Evans, Professor of Anatomy at the University of California, by a group of his friends

on his 60th birthday. It contains 48 articles on various biological subjects ranging from the historical and philosophical such as "The Impact of the Introduction of Iron on Medical and Religious Thought" by Alvarez, and "Impotency as a Result of Witchcraft" by Sigerist, through diverse phases of endocrinology such as "Pituitary Gonadotrophins" by Fraenkel-Conrat, Choh Hao Li and M. E. Simpson, and "Ovum, Cycle and Menstruation" by Zondek, to others on Physiology, Embryology, Nutrition, and on Pathology, the latter including titles such as "Pulmonic Interstitial Emphysema and Its Sequelae" by C. C. Macklin and M. T. Macklin, and "Observations on the Pathogenesis of Undulant Fever" by K. F. Meyer. A detailed analysis or even a complete list of all of these essays is not possible here because the fields covered are too diverse for review by one individual. The list of authors, however, alone carries authority and prestige which make this collection of essays a highly desirable source book for research workers and a monumental tribute to Professor Evans and his very fruitful and stimulating life work which, it is earnestly hoped, may continue for many years.

In the forepart of the volume are a fine sepia portrait of Dr. Evans, a dedication, and an explanatory note with acknowledgements from the Publication Committee consisting of Samuel T. Farquhar, Chauncy D. Leake, William R. Lyons, and Miriam E. Simpson, Chairman. These are followed by a biographical sketch, a complete bibliography of Dr. Evans (containing nearly 400 citations) from 1904 to 1942, and a table of contents.

MARTIN FROBISHER, JR.

Atlas of Human Anatomy—By F. Frohse, M. Brodel, and L. Schlossberg. (New ed.) New York: Barnes

& Noble, 1942. 90 pp. Price, \$2.25.

This book has been known since its first edition for the excellent color reproduction of the celebrated Frohse-Brodel anatomical charts. Public health workers who have sometimes only a thin veneer of knowledge in human biology will profit by and also enjoy the excellent introduction and explanatory text by Jesse F. Williams. The new edition shows for the first time a series of illustrations on the endocrine glands. As the microscopic illustrations are not in color, they do very little in helping to understand the function of the glands, and the explanatory text of this chapter by Charles F. Geschickter is too technical for the non-medical reader. Nevertheless, the book is still the best available pocket-size atlas on human anatomy.

BRUNO GEBHARD

Public Works Engineers Yearbook—1943—Chicago: American Public Works Association, 1943. 333 pp. Price, \$3.75.

This publication includes the year's affairs of the association and the proceedings of the 1942 Public Works Congress. Important and authoritative information on current technics and practices, reflecting the impact of war induced conditions upon essential operations in the public service field, is given in the proceedings. Employee relations, financial programming, substitutes and salvage, traffic, operation of sewerage systems and developments in refuse collection and disposal are among the topics covered.

ARTHUR P. MILLER

Laboratory Manual for Chemical and Bacterial Analysis of Water and Sewage—By Frank R. Theroux, M.C.E., Edward F. Eldridge, M.S., W. LeRoy Mallmann, Ph.D. New York: McGraw-Hill, 1943. 274 pp. Price, \$3.00.

This manual now appears in an enlarged third edition. In format it resembles the previous editions in that procedures are listed step by step. An entirely new section dealing with the testing of boiler waters has been added for the first time. Eight new testing procedures are suggested, descriptions are given for the preparation of about 20 new reagents, the general discussion of chemistry and related topics has been expanded, and many revisions have been made in the bacteriological section as a result of recent developments in this field. In addition, problems with answers are included in the general chemical discussion.

There is no doubt that the book in its present edition will prove to be as popular with operators, students, and others as have past editions. To this reviewer, however, it seems that recent research has given sufficient emphasis to the need for proper dilution waters in some of our biochemical oxygen demand studies on sewage and trade wastes to warrant a discussion of these waters and of procedures for their preparation.

C. P. STRAUB

Health Practice Indices—Prepared by the Subcommittee on Manual and Appraisal of Local Health Work for the Committee on Administrative Practice of the American Public Health Association. New York, 1943. 73 pp.

In *Health Practice Indices*, data submitted from the evaluation schedules for the National Honor Roll have been compiled. These make possible a study of the accomplishments in certain services of health departments. Analysis of these data for an understanding of procedures, and the assembly of this material in a form available for study by the various communities, seems to be a good idea. Although in evaluating administrative practice it is desirable to know the procedures being rendered and to compare results for

various areas, such comparisons are extremely difficult. It is well known that the comparison of crude death rates is subject to error. How much more difficult is the comparison of health department services when the actual need for health services varies in communities over the country according to composition of the population and the availability of medical services! Another factor to be considered is the need for adaptation of procedures according to local problems.

In *Health Practice Indices*, only communities are included which, due to interest or perhaps clerical assistance, submitted schedules, and thus the results are probably not representative of health department services for the country. Since the data have not been checked for consistency of interpretation, without doubt some of the variation—especially the extreme values—may be due to errors in the data submitted. One hundred per cent success is hard to attain in any program!

These are some of the factors to be considered in reading and using *Health Practice Indices*. This report should serve to stimulate discussion of the practicability and need for measures of health service.

R. H. HUTCHESON

A Guide to Practical Nutrition—Sponsored by the Committee on Nutrition and Deficiency Diseases of The Philadelphia County Medical Society. Edited by Michael G. Wohl, M.D., and John H. Willard, M.D. The Philadelphia County Medical Society, 1943. 98 pp.

This manual is a paper bound reprint of a series of short articles on various aspects of nutrition which appeared in *Philadelphia Medicine* in 1941–1942. The author of each of the thirteen subjects covered is a clinician, investigator, or dietitian on the staff of a local hospital or medical school.

The *Guide to Nutrition*, according to

the editors, is to be considered as part of a program of public health education and not a complete coverage of the field of nutrition, and is presented to the medical profession in order to increase the practising physician's interest in the new knowledge of nutrition.

The committee and authors are to be commended for their efforts to stimulate interest in this field. However, since the articles are written in a style and manner more suitable for journal presentation, one suspects that the purpose for which they were intended has already been accomplished by the original publications. There has been so much written recently on practical nutrition, both in a comprehensive and a brief form, that unless a new book possesses some unusual merits it is apt to attract little attention. *A Guide to Practical Nutrition* is not an exceptional book. The quality of the articles varies considerably; some subjects are presented concisely, clearly, and adequately for the purpose intended, while other sections suffer from lack of judgment in selection and interpretation of material or in clarity of presentation. The coverage is insufficient to recommend it as a guide to those interested in a brief but complete summary of the subject. However, the book will be of interest to those who wish to read short summaries of selected topics.

OTTO A. BESSEY

General Bacteriology—By D. B. Swingle. New York: Van Nostrand, 1943. 313 pp. Price, \$3.00.

This is a reprinting of a beginner's text originally published in 1940. The author considers the usual method of presenting bacteriological knowledge to be too frequently an elaboration of medical bacteriology, and has endeavored to present it as a distinct science with orderly arrangement, principles and applications comparable to those found in other sciences. Rela-

tionships to other branches of biological science, physics, and chemistry are stressed with the object of giving beginners a broad base on which to build advanced studies in the field.

Fundamentals of bacterial morphology, classification, and metabolism are presented first, followed by a brief discussion of yeasts and molds, and then by a series of chapters on bacteria of the soil, water, air, milk, industry, etc. Finally 40 pages are devoted to infection, immunity, and pathogenic organisms.

The text is illustrated with many photographs and drawings, most of the latter giving an impression of size and detail much beyond anything actually seen under the microscope.

EDMUND K. KLINE

Public Health Nursing in Obstetrics, Part IV, Mothers' and Fathers' Classes—New York: Maternity Center Association. 108 pp. Price, \$1.00.

Maternity Center Association's quarter century of experience in conducting Mothers' Classes, makes this book an attractive and a valuable source of information for any who want to start this kind of educational maternal health work. A good case is made for the need for more men's and women's classes. Ways to organize and conduct classes for both men and women are listed. Among the subjects considered are the instructor, sponsorship, approach, classroom arrangement, and teaching aids. If followed, the suggestions listed will protect the would-be educator from a number of errors. The unit outlines will serve as a check list for those who have been conducting classes and wish to compare course content.

The seven instruction units on Teaching Suggestions and Outlines for Mothers' Classes cover 75 of the book's 108 pages. Each outline has an introductory statement. Those which pre-

ceed the first two units are narrative in form and exceptionally well done. There is some unevenness in the quality of the outlines. The first two are quite technical and consist mostly of the basic material a teacher should have mastered for interpretation. Some instructors would not find that their class groups could benefit by such detailed discussions. The remaining outlines are both more general and more practical. Two features, the Bibliography and Teaching Aids, are more than ordinarily complete for such a volume, and the illustrations of the charts produced by, and available from Maternity Center are reproduced exceptionally well.

Though the Teaching Outlines for Fathers' Classes are rather disappointing in their brevity after the complete outlines for mothers, nevertheless, this book will be well received by those who are teaching, or those who plan to teach classes for mothers and fathers.

DAVID B. TREAT

Shipboard Medical Practice—By W. L. Wheeler, Jr. New York: Cornell Maritime Press, 1943. 106 pp. Price, \$1.00.

Shipboard Medical Practice is a handbook of 106 pages on emergency medical aid at sea. The advice and instructions given are based on using the materials and resources ordinarily available to seamen on ships and in lifeboats. The book is plainly written in a clear and concise language for seamen with little or no medical knowledge. Information on artificial respiration, shock, wounds, exposure, nutrition, and general care of lifeboat survivors is included. The supplies furnished in "Lifeboat and Life Raft First Aid Kits" are listed. The use of sulfathiazole in several different forms and for a number of different conditions is described.

A number of preventable diseases are discussed as to prevention, symptoms,

and treatment. While the entire discussion of specific diseases is quite brief, the preventive phases particularly, appear to the reviewer to be somewhat inadequately covered. The chapter on sanitation is definitely too brief, and is not entirely up to date.

While this little book will undoubtedly serve as a helpful handbook, as intended, a number of other more complete books on First Aid and on the prevention, symptoms, and treatment of specific diseases would seem to be desirable for seamen who may be called upon to render emergency medical aid on shipboard.

There is a closing chapter on the proper way to send emergency radio messages to medical officers of the U. S. Public Health Service, in order to be understood and thus save time, suffering, and perhaps life by receiving prompt advice.

ALFRED H. FLETCHER

Plumbing Practice and Design—Volume 2—By Svend Plum. New York: Wiley, 1943. 329 pp. Price, \$4.50.

This companion volume to the author's first text on plumbing is an attempt, as previously stated, to consolidate the scattered data on plumbing, and to present these data in uniform terminology and in a manner usable for solving the many problems occurring in the design of plumbing systems. Practical information is presented for use in the layout and design of water supply and heating systems, sewerage and drainage systems, and gas piping systems. There is a chapter on definitions of physical and chemical terms, one on codes and regulations, and one on architectural practice.

This text should do much to eliminate some of the mystery which shrouds present-day design of plumbing systems, as the designs presented are based on sound engineering principles.

C. P. STRAUB

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

In a Nutshell—For the past ten years the peak of the polio epidemic has usually occurred in the middle week of September, the average number of cases reported during the first 36 weeks of the year being 3,796. For 1943 the number reported (up to September 11) was 6,792. States with the highest incidence were: Connecticut, Illinois, Kansas, Oklahoma, Texas, Colorado, Arizona, Utah, and California.

ANON. Prevalence of Poliomyelitis. Pub. Health Rep. 58, 38:1412 (Sept. 17), 1943.

Reassuring Report — Highlights from a health accounting of the services: disease incidence lower in '42 than previous year and continuing good in '43; Army's V.D. at all-time low; meningitis epidemic fell off quickly; vaccinations proved effective against the diseases for which they are intended; dysenteries constitute chief threat in areas of high incidence, but malaria is the leading enemy. There are adequate supplies of essential drugs.

ANON. Health of the Armed Services. J.A.M.A. 123, 8:487 (Oct. 23), 1943.

Thoughts on an Inferential Science—This dissertation on wrong-way epidemiology and opinionated epidemiologists is not easy reading but it will make you into a more humble person if you read it. Humble and more soundly functioning, too.

AYCOCK, W. L. and RUSSELL, F. F. The Functions of Hypotheses in Epidemiology. Am. J. M. Sc. 206, 3:399 (Sept.), 1943.

Too Bad!—Calcium is probably one of the prevalent deficiencies in our diet. This researcher went to great pains to see if a galvanic current could be used

to measure the adequacy of calcium nutrition, but he reached the conclusion that he had educed no evidence that the response to galvanic stimulation was a good test for mild deficiency states.

BEEBE, G. W. Medical Evaluation of Nutritional Status. Milbank Quart. 21, 4:311 (Oct.), 1943.

Typhoid Vaccine at Work—Evidence is presented which indicates that the triple typhoid vaccine now used by the army is considerably the superior of the T A B product used during World War I.

CALLENDAR, G. R. and LUIPPOLD, G. F. The Effectiveness of Typhoid Vaccine Prepared by the U. S. Army. J.A.M.A. 123, 6:319 (Oct. 9), 1943.

Home Care of the Sick—How do people behave when they are sick? Some go to the doctor and more than half of those who do have medicine given or prescribed for them. Some ask the druggist what to take, but more think that Peruna, *et al.*, will do the trick so they demand what they want. As one might expect, men and women, well-to-do and poor, smalltown slickers, and city people all behave variously in these matters.

COLLINS, S. D. The Frequency of Doctor's Prescriptions and of Laboratory and Related Services in the Treatment of Illness. Milbank Quart. 21, 4:344 (Oct.), 1943.

Timely Notes on the Sniffles—Sinusitis, otis media, and the other sequelae of the common cold are reduced in number and severity if nose and throat are sprayed with a sulfonamide drug, with or without added medicaments, say the nine authors of the two papers named.

DOLOWITZ, D. A., *et al.* The Prevention of Ear and Nasal Sinus Complications of the Common Cold, (and) TURNBULL, F. M. *et al.* Sinusitis and Infections Secondary to the Common Cold. J.A.M.A. 123, 9:534 (Oct. 30), 1943.

Report on the First Ten Thousand—Adding up the minor disadvantages and major advantages of caudal analgesia, the authors point out again the great need for a high degree of obstetric competence on the part of physicians who propose to utilize the method. In such hands fetal mortality should be considerably decreased.

HINGSO, R. A., and EDWARDS, W. B. Continuous Caudal Analgesia. J.A.M.A. 123, 9:538 (Oct. 30), 1943.

What Next? —Sulfadiazine by mouth in small doses is an effective method of curbing epidemics of meningitis among large bodies of troops.

KUHNS, D. M., *et al.* The Prophylactic Value of Sulfadiazine. J.A.M.A. 123, 6:335 (Oct. 9), 1943.

Send Not To Ask For Whom the Bell Tolls—This is the story as I remember it: on a stifling July morning the chicken meat to make a supper salad for a large institution was shredded from the carcasses by hand, then salad dressing was thoroughly mixed into the meat, also by hand (bare), then the salad stood until supper time. One of the kitchen help who did the mixing had returned to work a day or two earlier after a 4 day bout with diarrhea. Just to complicate the picture, the cooked fowl stood for a day before shredding, the kitchen was far from clean, cockroaches and flies were plentiful. Instead of retailing to you the morbid statistics of the epidemic, these questions are asked: are there institutions like this one in your bailiwick, and what are you doing about them?

LUMSDEN, L. L., *et al.* A Study of an Outbreak of Food Poisoning in Galveston,

Texas. Pub. Health Rep. 58, 41:1497 (Oct. 8), 1943.

A Challenge to Unintelligent Complacency —Noise, say these authors, such as now attends most human activities is injurious. This is not a matter of speculation. Further, relief from noise is procurable, so patient endurance of excessive man-made noises is no longer a virtue. To this every reader of the article will say: Amen.

MCCORD, C. P., and GOODELL, J. D. The Abatement of Noise. J.A.M.A. 123, 8:476 (Oct. 23), 1943.

When Infected Hairs Become Fluorescent—This story of the unusual ringworm epidemic in certain New York schools, and the effective methods employed to end it should be clipped and stored away safely in your files of scientific material. Such an outbreak "shouldn't happen to you" but it may.

MITCHELL, H. H., *et al.* An Epidemic of Ringworm of the Scalp. Pub. Health Nurs. 35, 10:564 (Oct), 1943.

Early Treatment for Rabies—Conclusion-jumpers had better keep both feet on the ground but, experimentally, wounds inoculated with fixed rabies virus were as effectively treated when irrigated with green soap solution as when they were cauterized with fuming nitric acid. Sulfanilamide did no good whatever, and iodine "also ran."

SHAUGHNESSY, H. J. and ZICHIS, J. Prevention of Experimental Rabies. J.A.M.A. 123, 9:528 (Oct. 30), 1943.

Up to the War Years the Record Was Fine—From 1900 to 1941 the tuberculosis death rate shows an almost continuous, year-by-year decline (except for 1918). And this has occurred despite the ageing of our population and the late inclusion of certain states (with higher TB rates) to the registration

area. The decrease for females was greater than for males, and the reduction has been experienced by other groups as well as whites. A curve of tuberculosis mortality relative to total

mortality is suggested as an indicator of future courses of the disease.

YERUSHALMY, J., *et al.* Tuberculosis Mortality in the United States. Pub. Health Rep. 58, 40:1457 (Oct. 1), 1943.

BOOKS RECEIVED

- A HUNDRED YEARS OF MEDICINE. By C. D. Haagensen and Wyndham E. B. Lloyd. New York: Sheridan House, 1943. 443 pp. Price, \$3.75.
- THE EDUCATION OF NURSES. By Isabel Maitland Stewart. New York: Macmillan, 1943. 399 pp. Price, \$3.50.
- HEALTH INSTRUCTION YEARBOOK, 1943. Oliver E. Byrd, Editor. Stanford University Press, Calif., 1943. 308 pp. Price, \$3.00.
- CRIMINAL CAREERS IN RETROSPECT. By Sheldon and Eleanor Glueck. New York: Commonwealth, 1943. 380 pp. Price, \$3.50.
- CLINICAL LABORATORY METHODS AND DIAGNOSIS. By R. B. Gradwohl. 3d ed. St. Louis: Mosby, 1943. Vols. 1 and 2. Price, \$20.00.
- AN INTRODUCTION TO FOODS AND NUTRITION. By Henry C. Sherman and Caroline Sherman Lanford. New York: - Macmillan, 1943. 292 pp. Price, \$2.00.
- SYNOPSIS OF TROPICAL MEDICINE. By Sir Philip-Manson-Bahr. Baltimore: Williams & Wilkins, 1943. 224 pp. Price, \$2.50.
- BODY POISE. By Walter Truslow. Baltimore: Williams & Wilkins, 1943. 312 pp. Price, \$4.50.
- NATURE AND TREATMENT OF MENTAL DISORDERS. By Dom Thomas Verner Moore. New York: Grune & Stratton, 1943. 312 pp. Price, \$4.00.
- PRINCIPLES AND PRACTICE OF REHABILITATION. By John Eisele Davis. New York: Barnes, 1943. 211 pp. Price, \$3.00.
- BIOCHEMISTRY OF THE FATTY ACIDS. By W. R. Bloor. New York: Reinhold, 1943. 387 pp. Price, \$6.00.
- CLINICAL DIAGNOSIS BY LABORATORY EXAMINATIONS. By John A. Kolmer. New York: Appleton-Century, 1943. 1239 pp. Price, \$8.00.
- PERSONAL AND COMMUNITY HEALTH. By C. E. Turner. 7th ed. St. Louis: Mosby, 1943. 585 pp. Price, \$3.50.
- FOOD POISONING. By Elliott B. Dewberry. London: Hill, 1943. 186 pp. Price, \$3.75.
- FUNDAMENTALS OF NUTRITION AND DIETETICS: A WORKBOOK. By Alberta Dent. 2nd ed. New York: Wiley. 209 pp. Price, \$2.00.
- ORTHOPEDIC NURSING. By Robert V. Funsten and Carmelita Calderwood. St. Louis: Mosby, 1943. 602 pp. Price, \$3.75.
- TEXTBOOK OF PHYSIOLOGY. By William D. Zoethout and W. W. Tuttle. 8th ed. St. Louis: Mosby, 1943. 728 pp. Price, \$4.75.
- ALLERGY, ANAPHYLAXIS AND IMMUNOTHERAPY. BASIC PRINCIPLES AND PRACTICE. By Bret Ratner. Baltimore: Williams & Wilkins, 1943. 834 pp. Price, \$8.50.
- NOTABLE CONTRIBUTORS TO THE KNOWLEDGE OF SYPHILIS. By Herman Goodman. New York: Froben, 1943. 144 pp. Price, \$3.00.
- VITAL STATISTICS RATES IN THE UNITED STATES 1900-1940. By Forrest E. Linder and Robert D. Grove. Washington: United States Government Printing Office, 1943. 1051 pp. Price, \$1.75.
- TUBERCULOSIS IN THE UNITED STATES. Graphic Presentation. Vol. 1. New York: National Tuberculosis Association.
- LEADERSHIP AND ISOLATION. A Study of Personality in Inter-Personal Relations. By Helen Hall Jennings. New York: Longmans, Green, 1943. 240 pp. Price, \$3.00.
- THE NUTRITION FRONT. Report of the New York State Joint Legislative Committee on Nutrition. Legislative Document No. 64, 1943. Albany, N. Y.
- HANDBOOK FOR USE OF INSTRUCTORS AND ADMINISTRATORS RED CROSS HOME NURSING. School Edition. Washington, D. C. American National Red Cross.
- RED CROSS HOME NURSING. School Edition. By Lona L. Trott. Philadelphia: Blakiston, 1943. 363 pp. Price, Paper \$.60, Cloth \$1.10.
- COURSE OF STUDY IN HEALTH. Grades One to Eight. Archdiocese of Boston. 1943.
- HEALTH PRACTICE INDICES. Prepared by the Subcommittee on Manual and Appraisal of Local Health Work for the Committee on Administrative Practice of the American Public Health Association. 1943.
- SOVIET HEALTH. CARE IN PEACE AND WAR. New York American Russian Institute for Cultural Relations with the Soviet Union, Inc. 1943. Price, \$.10.
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ASSOCIATION NEWS

JOHN J. SIPPY, M.D., PRESIDENT-ELECT

Dr. Sippy, a native of Madison County, Ill., is a graduate in 1899 of the St. Louis College of Physicians and Surgeons. He practised medicine for several years and was successively County Health Officer in Kansas and Epidemiologist to the Kansas State Department of Public Health. For three

1923, he has been District Health Officer of the San Joaquin Local Health District, with headquarters in Stockton, Calif. Since 1934, he has been Associate Clinical Professor of Public Health and Preventive Medicine at the School of Medicine, Stanford University.

Since he has been in the West, Dr. Sippy has served as Secretary of the Montana Public Health Association and, in 1929, he was President of the Northern California Public Health Association. The Western Branch, American Public Health Association, honored him in 1941 with the Presidency. Twice he has been President of his County Medical Association. He was President of the League of California Cities in 1927. He has been a member of the White House Conference on Child Health and Protection and, for ten years, held a Reserve Commission as Passed Assistant Surgeon in the U. S. Public Health Service. Dr. Sippy joined the Association in 1919 and was elected to Fellowship in the Health Officers Section in 1930. Throughout the western states, Dr. Sippy has had a wide influence in administrative practice, where he is generally regarded as the Dean of local health officers.

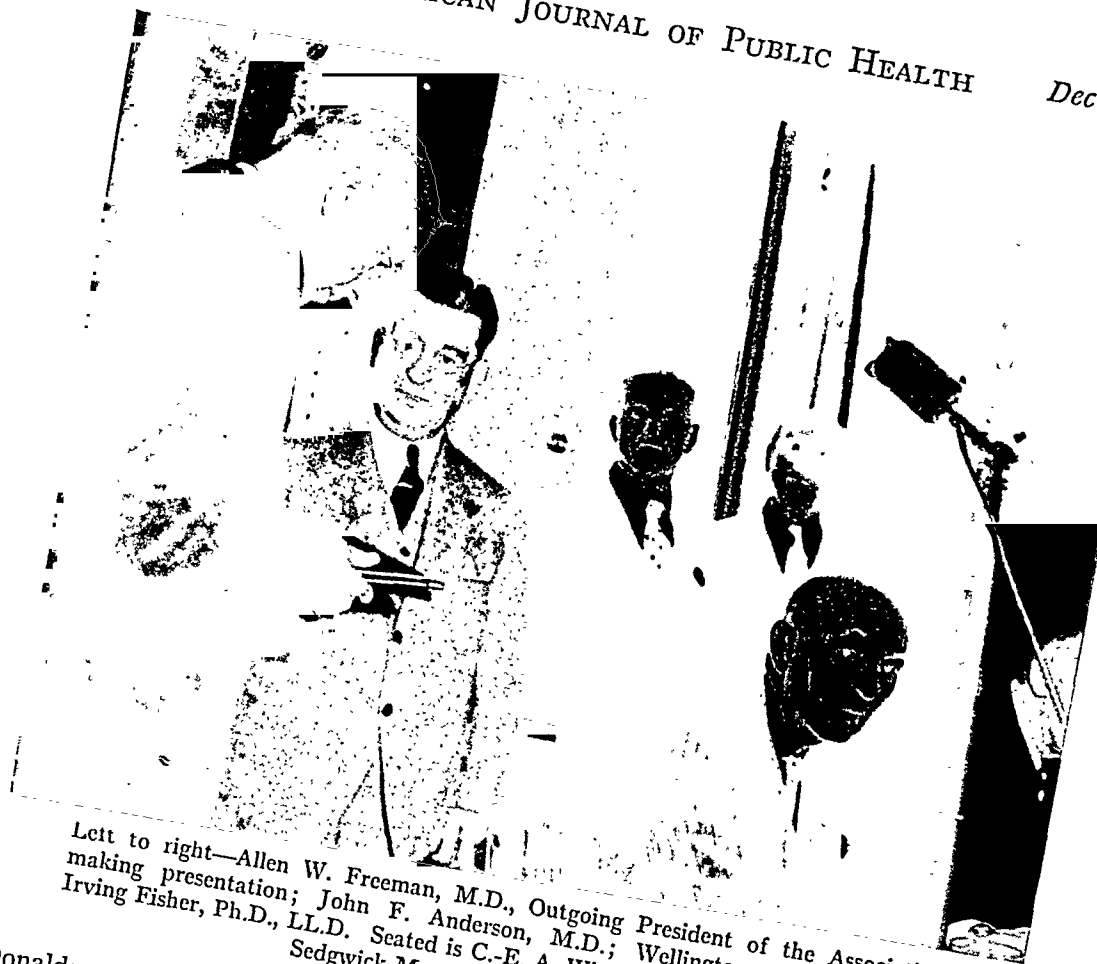


JOHN J. SIPPY, M.D.

years he served as Executive Secretary of the Kansas Tuberculosis Association and as lecturer on communicable disease at the University of Kansas School of Medicine. In 1919, Dr. Sippy moved to Montana, where for three years he was Epidemiologist and then Director of Child Welfare in the Montana State Department of Health. Since

FORTY-YEAR MEMBERSHIP RECOGNITION

At the 2nd General Session of the New York Annual Meeting and Wartime Conference, Dr. Allen W. Freeman, President of the Association, presented three forty-year membership certificates to the following persons: John F. Anderson, M.D. of New Brunswick, N. J., President of the American Public Health Association in 1916; Wellington



Left to right—Allen W. Freeman, M.D., Outgoing President of the Association, making presentation; John F. Anderson, M.D.; Wellington Donaldson; and Irving Fisher, Ph.D., LL.D. Seated is C.-E. A. Winslow, Dr.P.H., Chairman of the Sedgwick Memorial Medal Committee.

Donaldson of the Department of Public Works of New York City; Irving Fisher, Ph.D., LL.D., of Yale University, New Haven, Conn.

Dr. Freeman pointed out that this custom was begun 8 years ago, since which time twenty-three awards have been made to members who joined the Association as far back as 1878. The senior name of those holding extended memberships is that of Dr. John Harvey Kellogg of Battle Creek, Mich., who joined the Association in 1878. Dr. Kellogg thus completes 65 years of membership in the Association.

NEW A.P.H.A. SECTION ON DENTAL HEALTH

The Governing Council at the 72nd Annual Meeting of the Association recently held in New York City created

a Section on Dental Health, making twelve sections in all for the American Public Health Association. This is an outgrowth of the Oral Health Group started in 1937 in an attempt to explore this field on an informal basis.

The new Officers of the Section on Dental Health are as follows:

Chairman: Kenneth A. Easlick, D.D.S., School of Public Health, University of Michigan, Ann Arbor, Mich.

Vice-Chairman: J. M. Wisan, D.D.S., State Department of Health, Trenton, N. J.

Secretary: W. J. Pelton, D.D.S., M.S.P.H., U. S. Public Health Service, Washington 14, D. C.

Section Council:

1948—C. R. Taylor, D.D.S., M.S.P.H., Michigan State Health Department, Lansing, Mich.

1947—Lester A. Gerlach, D.D.S., City Health Department, Milwaukee, Wis.

1946—George A. Nevitt, D.D.S., M.S.P.H.,

Sub-Treasury Building, 15 Pine Street, New York, N. Y.

1945—Richard C. Leonard, D.D.S., M.S.P.H.,
State Department of Health, Baltimore, Md.

1944—Allen O. Gruebbel, D.D.S., M.P.H.,
State Board of Health, Jefferson City, Mo.

This recognition of the expanding place of public health dentistry has been accomplished with full realization that public health dentistry stands to gain from the inter-Sectional relationships afforded by the American Public Health Association and especially with the interests represented in the School Health Section, the Public Health Education Section, the Food and Nutrition Section, and the Epidemiology Section. It is anticipated that, by means of joint sessions and other coöperative planning, there may be achieved a better orientation of public health dentistry with the other specialties of the public health movement.

The Association office is prepared to receive applications for membership in the new Section on Dental Health, either from persons already identified with other Sections of the American Public Health Association or from new members. Address the Association, 1790 Broadway, New York 19, New York.

PROGRESS IN THE MERIT SYSTEM UNIT

During the Annual Meeting of the Association, the Subcommittee on Merit Systems of the Professional Education Committee reported on progress in supplying examination materials to state merit system councils. Dr. George H.

Ramsey indicated that the public health nursing materials have been used in 10 states for 34 examinations. There is now a substantial demand from other fields in public health and the Unit is prepared to provide examination questions for medical health officers, laboratory workers, and in the field of environmental sanitation. Subject consultants appointed to assist the Unit in the two latter fields are: Dr. Edmund K. Kline, Secretary of the A.P.H.A. Laboratory Section, and Alfred Fletcher of Johns Hopkins University with the assistance of Walter Mangold of the University of California. Dr. Lillian Dick Long continues as psychometrician. Assistance in securing suitable questions for these fields is being sought from groups outside of the New York area, and reviewers—especially in the field of public health nursing—have been chosen from all over the United States.

During the Annual Meeting the staff of the Merit System Unit held consultation hours and a report of progress in the field of public health nursing was made by the Subject Consultant, Dorothy Deming, to the State Supervising Nurses and the Public Health Nursing Section. A round-table meeting, open to all interested in merit system problems, was held on October 14. Approximately 35 persons attended including representatives of the U. S. Public Health Service, Children's Bureau, and State Merit System Councils.

NEW FELLOWS OF THE AMERICAN PUBLIC HEALTH ASSOCIATION ELECTED AT THE WARTIME PUBLIC HEALTH CONFERENCE

Health Officers Section

Franklyn B. Amos, M.D., M.S.P.H.

Daniel Bergsma, M.D.

Edward R. Krumbiegel, M.D.

Carl N. Neupert, M.D., M.S.P.H.

William M. Smith, M.D., M.P.H.

Mary Steichen, M.D., M.S.P.H.

Wilmier M. Talbert, M.D., M.S.P.H.

Alexander Witkow, M.D., M.P.H.

Laboratory Section

G. D. W. Cameron, M.D., D.P.H.

Orren D. Chapman, M.D.

Ward H. Cook, M.D.

Gordon E. Davis, Sc.D.

William J. Deadman, M.B.

Claude E. Dolman, M.B., D.P.H.

George F. Forster, Ph.D.

R. J. Gibbons, M.D., D.P.H.

Bettylee Hampil, Sc.D.
Margaret W. Higginbotham, Sc.D.
Cyril K. Johns, Ph.D.
Col. Dwight M. Kuhns, M.C.
Edith Kuhns, B.S.
Donald J. Mackenzie, M.D., C.M.
J. Howard Mueller, Ph.D.
Ruth M. Myers, M.S.
Nathan Nagle, A.B.
Elizabeth I. Petran, Ph.D.
Percy M. Phelps, Ph.B., A.M.
Norman J. Pyle, V.M.D.
James D. Reid, Sc.D.
Morris F. Shaffer, Ph.D.
Major Edgar J. Staff, Sn.C.
William A. Starin, Ph.D.
Charles A. Stuart, Ph.D.
Earl J. Sunkes, D.P.H.
William H. Swartzendruber, B.A.
Anna I van Saun
Harriette D. Vera, Ph.D.
Kenneth M. Wheeler, Ph.D.
Lieut. Edwin O. Wicks
Arthur W. Wright, M.D.

Vital Statistics Section

John W. Fertig, Ph.D.

Engineering Section

Gerald E. Arnold, C.E.
Leonard M. Board, C.E.
Herbert M. Bosch, M.P.H.
J. Matt Carr, M.S.
Lloyd K. Clark, S.B.
Charles M. Davidson, B.S.C.E.
Samuel M. Ellsworth, B.S.
Herbert B. Foote, C.E.
Harold B. Gotaas, M.S.C.E., Sc.D.
Carl D. Gross, M.S.
Herbert H. Hasson, B.S.
Chauncey A. Hyatt
James M. Jarrett, B.S.C.E.
Francis W. Kittrell, M. S.
Clarence W. Klassen, B.S.C.E.
William H. Larkin, C.E.
Maurice LeBosquet, Jr., M.S.
David B. Lee, M.S.S.E.
John A. Logan, D.Sc.
Alan C. Love, M.S.S.E.
Franz J. Maier, B.S.C.E.
Milton M. Miller, M.S.
Emanuel H. Pearl, M.S.E.
Major Harley M. Riley, Sn.C.
Charles L. Senn, B.S.C.E.
L. Glen Shields, M.S.
Chester A. Smith, B.S.C.E.
W. Brewster Snow, M.S.
Frank M. Stead, M.S.
James H. Stephens, M.S.
Dick C. Thompson, B.E.
Clarence J. Velz, C.E.

W. Wallace White, C.P.H.
Ben L. Williamson, M.S.
Joseph A. Willman, M.S.
Lewis A. Young, M.S.

Industrial Hygiene Section

Joseph C. Aub, M.D.
Hugh P. Brinton, Ph.D.
John F. Cadden, M.D., M.P.H.
Robert H. Flinn, M.D.
William G. Fredrick, Sc.D.
Lydia G. Giberson, M.D., C.M.
Lyman D. Heacock, D.D.S., M.P.H.
Lemuel C. McGee, M.D., Ph.D.
Stuart F. Meek, M.D.
A. Victor Nasatir, M.D., M.S.P.H.
Frank A. Patty, B.S.
O. A. Sander, M.D.
Alfred N. Setterlind, M.S.
Joseph Shilen, M.D.
Emil A. Steiner, M.D., M.P.H.
James H. Sterner, M.D.
Major Leon H. Warren, M.C.
John J. Wittmer, M.D.
McIver Woody, M.D.

Food and Nutrition Section

C. Olin Ball, Ph.D.
Adelia M. Beeuwkes, M.S.
Florence H. Case, B.S.
Ruth C. Clouse, Ph.D.
James E. Fuller, Ph.D.
Robert S. Harris, Ph.D.
Raymond Hertwig, B.S.
Bertha Holman
Bernice Hopper, M.S.
Helen A. Hunscher, Ph.D.
Ruth M. Kahn, M.S.
Emanuel Kaplan, Sc.D.
Milton L. Laing, M.S.
Louis Lang, M.A.
Ethel A. Martin, M.S.
Roe E. Remington, Ph.D.
Grace H. Sanders, M.S.
Jane Sedgwick, B.S.
Helen R. Stacey, M.A.

Maternal and Child Health Section

William L. Hughes, Ph.D.
Betty Huse, M.D.
Emory W. Morris, D.D.S.
Ruth J. Raattama, M.D., M.P.H.
William M. Schmidt, M.D.
Susan P. Souther, M.D., M.P.H.

Public Health Education Section

C. K. Chu, M.D., Dr.P.H.
John E. Farrell, B.A.
Fay M. Hemphill, M.S.P.H.
Alice H. Miller, C.P.H.
Eunice N. Tyler, C.P.H.

Epidemiology Section

Herman C. Mason, Ph.D.

Unaffiliated

Oswald N. Andersen, M.D.
 Kenneth A. Easlick, D.D.S.
 Lester A. Gerlach, D.D.S.
 Allen O. Gruebbel, D.D.S., M.P.H.
 Albert D. Kaiser, M.D.

George A. Nevitt D.D.S., M.S.P.H.
 Walter J. Pelton, D.D.S., M.S.P.H.
 C. Morley Sellery, M.D.
 Brig. Gen. James S. Simmons, M.C.
 Clifford R. Taylor, D.D.S., M.S.P.H.

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Neale M. Atkins, M.D., Graves County Board of Health, Mayfield, Ky., Health Officer
 Vernon A. Ayer, M.D., M.S.P.H., 2309 7th Ave., New York, N. Y., Asst. Health Officer, New York City Health Dept.
 Willard C. Baker, M.D., 5673 Main St., Williamsville 21, N. Y., Health Officer, Consolidated Health District
 Raymond F. Barnes, M.D., 22 North Elm Ave., Webster Groves, Mo., Assoc. Director, Medical Health Service, Mid-Western Area, American Red Cross
 F. Wellington Brecker, M.D., 27 Wells Ave., East Hartford, Conn., Health Officer
 Dr. Agnes L. Brown, Muhlenberg County Health Dept., Greenville, Ky., Health Officer
 Cleaveland Floyd, M.D., 246 Marlborough St., Boston, Mass., Chief Medical Examiner, Tuberculosis Division, Boston Health Dept.
 Leonhard F. Fuld, Ph.D., Medical Center, Jersey City 4, N. J., Health Director
 Louis E. Harmon, M.D., 2340 Madison Ave., Baltimore, Md., Supervisor, Venereal Disease Clinic, City Health Dept.
 William H. Kober, M.D., Box F, Lima, N. Y., Health Officer
 Bernard McD. Krug, M.D., County Commissioner of Health, Cortland, N. Y.
 Eaton G. Lindner, M.D., 1117 Lake Wier Ave., Ocala, Fla., Director, City-County Health Dept.
 S. Easton McManis, M.D., 407 E. Main St., Endicott, N. Y., Health Officer, Village of Endicott
 Verlin E. Miles, M.D., 1604 N. Garfield St., Arlington, Va., Asst. Health Officer, Arlington County Health Dept.
 Fridgeir Olason, M.D., M.P.H., Harvard School of Public Health, Boston, Mass., Student
 Dorothy A. Oppenheim, M.D., 769 Onderdonk Ave., Brooklyn 27, N. Y., Asst. Health Officer, New York City Dept. of Health
 A. R. Perry, M.D., M.P.H., Health Dept., Natchez, Miss., Director, Adams County Health Dept.

Robert W. Ripley, M.D., Court House, Pasco Wash., Asst. Health Officer, Benton-Franklin District Health Office
 Edward S. Rogers, Bureau of Health, City Hall, Trenton, N. J., Chief Sanitary Inspector
 Major Sidney N. Tucker, M.C., Letterman General Hospital, Presidio of San Francisco, Calif., Chief of Communicable Disease Section
 Clark H. Yeager, Dr.P.H., 13 Midvale Rd., Baltimore, Md., Chief of Medical Section, Health and Sanitation Div., Office of Coordinator of Inter-American Affairs

Laboratory Section

Lt. Col. Joseph D. Aronson, M.C., Station Hospital, Fort Belvoir, Va., Laboratory Officer, U. S. Army
 Leitha D. Bunch, M.A., 635 North Fairview, Lansing 12, Mich., Biochemist, State Dept. of Health
 Benjamin W. Carey, M.D., 142 Second Ave., Westwood, N. J., Asst. Director, Lederle Laboratories, Inc.
 Philip L. Carpenter, Ph.D., Dept of Bacteriology, Rhode Island State College, Kingston, R. I., Asst. Professor of Bacteriology
 Lt. Arthur J. Cohane, Sn.C., 273 Station Hospital, Camp Butner, N. C., Sanitary Officer, U. S. Army
 Carl E. Duffy, Ph.D., 106 S. Lansdowne Ave., Lansdowne, Pa., Bacteriologist, Sharp & Dohme, Inc.
 Armand Frappier, M.D., 2900 Mt. Royal Blvd., Montreal, Que., Canada, Director, Institute of Microbiology and Hygiene, Univ. of Montreal
 Helen H. Gillette, 519 State House, Boston, Mass., Senior Bacteriologist, State Dept. of Public Health
 Cpl. Louis J. Grosso, SCU 1941, P. O. Box 651, Tracy, Calif., Laboratory Technician and Water Analyst, U. S. Army
 S. David Kramer, Ph.D., State Dept. of Health Labs., Div. of Virology, Lansing 4,

- Mich., Assoc. Director, Bureau of Laboratories
- Katherine V. Kreidel, Ph.D., 2225 Watson Ave., New York 61, N. Y., Instructor in Physiology, Hunter College
- Kathleen D. Muelder, Ph.D., 702 N. Francis Ave., Lansing 12, Mich., Bacteriologist, State Dept. of Health Labs.
- John M. Newell, D.Sc., 50 Louder's Lane, Jamaica Plain 30, Mass., Senior Chemist, Massachusetts Antitoxin and Vaccine Lab.
- Ruth H. Rose, State Dept. of Health, Lansing, Mich., Bacteriologist
- Rebecca L. Shapiro, M.S., 345 E. 17th St., New York, N. Y., Bacteriologist, Foster D. Snell, Inc., Brooklyn, N. Y.
- Capt. Ruell A. Sloan, M.C., 2738 Arlington Ave., New York 63, N. Y., Pathologist, U. S. Army
- Mathilde Solowey, Ph.D., U. S. Dept. of Agriculture, Chestnut Hill Station, Philadelphia, Pa., Assoc. Bacteriologist, Eastern Regional Research Laboratory
- Alfred L. Sotier, M. S., 1532 Biddle Ave., Wyandotte, Mich., Section Head, Research Dept., Wyandotte Chemicals Corp.
- George G. Stilwell, M.D., Mayo Clinic, Rochester, Minn., Clinical Pathologist
- Frances M. Stoddard, 2512 N.E. Glisan, Portland, Ore., City Bacteriologist, Bureau of Health
- Willard F. Verwey, D.Sc., Sharp & Dohme, Inc., Glenolden, Pa., Director of Bacteriological Research, Medical Research Division
- Capt. George R. Weber, Sn.C., Station Hospital, Fort Belvoir, Va., Sanitary Officer, U. S. Army
- G. Willard Webster, R. D. 3, West Chester, Pa., Bacteriologist, Medical Research Division, Sharp & Dohme Inc.
- Capt. Nahum J. Winer, M.C., Hunter Field, Savannah, Ga., Laboratory Officer, U. S. Army
- Lucile E. Wirsig, 314 Mountain View Ave., San Bernardino, Calif., Technician, Public Health Laboratory, County of San Bernardino

Vital Statistics Section

- Marie Cakrtova, M.D., M.P.H., 3021 North Calvert St., Baltimore, Md., Instructor in Preventive Medicine, Johns Hopkins University Medical School

Engineering Section

- Albert N. Aeryns, M.S., 716 Greenwood Ave., Brooklyn, N. Y., Sanitary Engineer, New York City Dept. of Health
- Lanham T. Barnard, Box 749, Texarkana, Tex., Sanitation Superintendent, Texarkana-Bowie County Health Unit

- George Davidson, 284 College St., Macon, Ga., Public Health Engineer, State Health Dept.
- Joseph L. Doyle, 9 Roslyn Court, Roslyn, N. Y., Consultant Engineer, Standard Cap & Seal Corp.
- Frank C. Hale, Hq. I Troop Carrier Command, Stout Field, Ind., Sanitary Officer
- J. Elliott Hale, M.S., Highland Ave., Winthrop, Me., Acting Director, Div. of Sanitary Engineering, State Bureau of Health
- Joseph L. Quinn, Jr., 1098 W. Michigan, Indianapolis, Ind., Acting Director, Div. of Sanitation, State Board of Health
- Charles E. Renn, Ph.D., 2 Willard St. Court, Cambridge, Mass., Assoc. Professor of Sanitary Biology, Harvard Univ.
- George W. Roddy, 2424 Sixth Ave., San Diego, Calif., Sanitary Engineer, U. S. Army Corps of Engineers
- James H. Tillman, 4412 Cambridge St., El Paso, Tex., Sanitary Engineer, El Paso City-County Health Unit

Industrial Hygiene Section

- Catherine R. Dempsey, R.N., One Craigie St., Cambridge, Mass., Industrial Nursing Supervisor, Simplex Wire & Cable Co.
- Karl L. Dunn, Corning Glass Works, Corning, N. Y., Industrial Hygienist
- Lt. Freeman D. Love, M.C., 167 Clinton St., Brooklyn, N. Y.
- Hannah L. Peters, M.D., 30 Panoramic Way, Berkeley 4, Calif., Richmond Field Hosp., Richmond, Calif.
- Arthur C. Stern, M.S., 55 West 95th St., New York, N. Y., Assoc. Dust Control Engineer, Div. of Industrial Hygiene, New York State Dept. of Labor
- Miriam Warner, M.D., Dr.P.H., 21 West School House Lane, Philadelphia, Pa., Physician, Municipal Court

Food and Nutrition Section

- Carlton J. Austin, M.S., 15 S. 34th St., Philadelphia 4, Pa., Director of Laboratories, Supplee-Wills-Jones Milk Co.
- Dana Coman, M.D., 401 Seventh Ave., New York, N. Y., Consultant, U. S. Army Air Force
- Elizabeth Kingsbury-Caso, M.S., Bureau of Health, Augusta, Me., Nutrition Consultant, State Dept. of Health & Welfare
- Winefred B. Loggans, 863 E. Michigan Ave., Battle Creek, Mich., Home Economics Field Representative, Kellogg Company
- Dorothea Nicoll, 10 Montague St., Arlington Heights, Mass., Supervisor of Nutrition, State Dept. of Public Health
- Emily K. Stamm, M.S., 28 Gard Ave., Bronx-

- ville 8, N. Y., Nutritionist, New York City Health Dept.
- James C. Thomson, Ph.D., 38 Alexander St., Princeton, N. J., Student, Johns Hopkins Univ. School of Public Health
- Isabel N. Young, M.A., American Can Co., 230 Park Ave., New York 17, N. Y., Director, Home Economics Dept.

Maternal and Child Health Section

- George S. Fräuenberger, M.D., 125 Worth St., New York, N. Y., Chief, Division for Physically Handicapped Children, New York City Dept. of Health
- Joseph Napoleol Laporte, M.D., D.P.H., 4235 Fabre, Montreal, Que., Canada, Supt. Child Hygiene Division, City Health Dept.
- Martha W. MacDonald, M.D., 235 2nd St., S.E., Washington, D. C., Psychiatric Services Adviser, U. S. Childrens Bureau
- Evelyn M. Rude, M.D., Seminole County Health Unit, Seminole, Okla., Asst. Director
- Edith E. Santella, R.N., 149 Park Ave., Paterson, N. J., Public Health Nurse, State Dept. of Health
- Sallie H. Saunders, M.D., 32 Woodside Park, Winthrop, Mass., Asst. Director, Child Hygiene Division, State Dept. of Public Health
- Dr. Herman Schwarz, 110 East 90th St., New York, N. Y., Pediatrician
- Leonard P. Younglao, M.B., M.P.H., Roseau, Dominica, Windward Islands, British West Indies, Health Officer, Government of Dominica

Public Health Education Section

- Louise G. Campbell, M.S., 39 N. Broad, Norwich, N. Y., Field Demonstrator, State Committee on Tuberculosis and Public Health
- Margaret Campbell, School of Public Health, Univ. of N. C., Chapel Hill, N. C., Student
- Raymond F. Clapp, 212 E. Jefferson St., Falls Church, Va., Assoc. Director, Social Protection Division, Federal Security Agency
- May Clark, 30 Chestnut St., Lewiston, Pa., Exec. Sec., Mifflin County Tuberculosis Society
- Florence L. Cochrane, R.N., 115 Stuyvesant Place, St. George, S. I., N. Y., Exec. Sec., Staten Island Tuberculosis and Health Committee
- Helen M. Donderewicz, D.H., 138 Chestnut St., Albany 6, N. Y., Dental Hygienist, State Health Dept.
- Mary A. Eagan, M.A., R.N., 737 S. Wolcott Ave., Chicago, Ill., Director, Public Health Education, Cook County Public Health Unit
- Willard C. Fleming, D.D.S., College of Den-

tistry, Univ. of Calif., San Francisco, Calif., Dean

- Claudia B. Galiher, 1629 Montague St., N.W., Washington 11, D. C., Research & Exhibits, District of Columbia Tuberculosis Assn.
- Edward J. Hall, 5015 Noyes Ave., Charleston 4, W. Va., Venereal Disease Educational Consultant, State Health Dept.
- George T. Harding, M.D., 463 East Town St., Columbus, Ohio, Member, Health Council, Council of Social Agencies
- Helen G. F. Hutton, 62 Montague St., Brooklyn, N. Y., Field Worker, Neighborhood Health, Inc.
- Marguerite E. Kempf, R.N., 119 Walsh Rd., Lansdowne, Pa., Asst. Supervisory Nurse, Atlantic Seaboard Agency Workers Health Assn.
- Urania Rauter, City Hall, Room 613, Milwaukee, Wis., Lecturer on Social Hygiene, Milwaukee Health Dept.
- Alice Saar, 447 Belmont Ave., Chicago, Ill., Director, Medical Division, Chicago Welfare Administration
- Andre Sam, M.D., Hospital St. Nicolas, St. Marc, Haiti, West Indies, Health Officer, Medical and Sanitary District of St. Marc
- M. Alexine Tanner, 1228 Fairmont St., N.W., Washington, D. C., Asst. Health Education Secretary, District of Columbia Tuberculosis Assn.

Public Health Nursing Section

- Elizabeth Albrecht, 971-1st Ave., New York 29, N. Y., Supervisor of East Harlem Center, Henry Street Visiting Nurse Service
- Gladys J. Asplum, R.N., Post Rd., Darien, Conn., Nurse Director, Darien Public Health Nursing Assn.
- Grace M. Beers, R.N., 307 N. Bedford St., Georgetown, Dela., Supervisor of Nurses, State Board of Health
- Nelliana Best, M.N., 501 West 113th St., New York 25, N. Y., Asst. Supervisor, Henry Street Visiting Nurse Service
- Belle Blackwell, R.N., Harris County Health Unit, Houston, Tex., Supervising Nurse
- Estelle W. Blatt, R.N., M.S., 529 S. Wabash Ave., Chicago 5, Ill., Director, Dept. of Home Nursing, Chicago Chapter, American Red Cross
- Mary A. Coleman, 61 Stuyvesant Place, Staten Island 1, N. Y., Exec. Director, Visiting Nurse Assn. of Staten Island
- Martha H. Crawford, M.N., 155 East 54th St., New York, N. Y., Supervisor, Henry Street Visiting Nurse Service
- Jean C. Doyle, Box 102, Rumford, Me., Field Nurse, State Bureau of Health
- Gesine A. Franke, Box 374, Huntingdon,

- Tenn., Public Health Nurse, U. S. Public Health Service
- Jane D. Gavin, R.N., M.A., 619 E. Prospect St., Marshall, Mich., Public Health Nursing Supervisor, Calhoun County Health Dept.
- Ruth E. Hawkins, State Bureau of Health & Welfare, Farmington, Me., Supervising Nurse
- Ferne D. Hood, 6839 Palm Ave., Riverside, Calif., Supervisor, Public Health Nursing Staff, Riverside County Health Dept.
- Phebe B. Kirby, Rt. 3, Box 360, Santa Cruz, Calif., Supervising Nurse, Santa Cruz County Public Health Dept.
- Mamie T. Klayman, R.N., 4403 N. LaCrosse Ave., Chicago 30, Ill., Instructor in Public Health Nursing, Evanston Hospital
- Ella M. McClunin, R.N., 19 High St., Auburn, Me., State Field Nurse, State Bureau of Health
- Elizabeth M. Moore, Meharry Medical College, Nashville, Tenn., Instructor & Coordinator of Health Education
- Anne P. Nolan, 114 Webster Ave., Goshen, N. Y., Supervising Public Health Nurse, Orange County Public Health Committee
- Clarice B. Purcell, R.N., 34 Park St., South Paris, Me., Field Nurse, State Bureau of Health
- Ruth K. Reenstjerna, R.N., 69 President, Charleston, S. C., State Orthopedic District Consultant, State Board of Health
- Helen R. Romaszkiwicz, M.A., 290 Mills St., Buffalo, N. Y., Educational Director, Buffalo Visiting Nurse Assn.
- Anna L. Rontal, R.N., Box 304, Braggs, Okla., Public Health Nurse, American Red Cross
- Katharine F. Roth, 505 N. Broom St., Wilmington, Del., Nursing Consultant in Venereal Diseases, State Board of Health
- Caroline G. Russell, 59 Amos Garrett Blvd., Annapolis, Md., Supervisor, Maternal Hygiene, Anne Arundel County Health Dept.
- Cecile O. Sparkman, Lewisburg Ave., Franklin, Tenn., Staff Nurse, Williamson County Health Dept.
- Jeanette B. Vroom, M.A., Lincoln Highway, Rt. 2, Wrightsville, Pa., Nursing Consultant, American Red Cross Nursing Service
- Gladys G. Weber, Strawtown Rd. & Demarest Ave., West Nyack, N. Y., Public Health Nurse, Rockland County Public Health Nursing Service, State Dept. of Health
- N. C., Assoc. Professor of Public Health Admin. & Vital Statistics
- Oswald F. Hedley, M.D., 34 Highland Ave., Newtonville, Mass., Senior Surgeon, U. S. Public Health Service
- Elizabeth J. Martinelli, Oakland Health Dept., Oakland, Calif., Deputy Registrar of Vital Statistics
- Mary E. Pillsbury, M.A., R.N., 5 Prospect Place, New York 17, N. Y., Nurse and Writer
- Major Leo V. Schneider, M.C., 206 Berkeley Place, Brooklyn, N. Y., Post Surgeon's Office, Army of the U. S.
- James K. Shafer, M.D., M.P.H., 15397 Cherrylawn Ave., Detroit 21, Mich., Venereal Disease Control Officer, Wayne County Health Dept.
- Hugh H. Smith, M.P.H., The Rockefeller Foundation, 49 W. 49th St., New York, N. Y., Staff Member, International Health Division

School Health Section

- Rose C. Boyer, M.D., 16 W. 77th St., New York, N. Y., Supervising School Physician, N. Y. City Dept. of Health
- Vera H. Brooks, M.A., R.N., N. J. State Teachers College, Newark, N. J., Instructor in Health Education
- Mattie J. Bullard, M.D., 524 Garfield, Gary, Ind., Acting Director, Dept. of Medical Inspection, Gary Public Schools
- Alice E. Butler, M.D., 270 Commonwealth Ave., Boston, Mass., School Physician
- Darell B. Harmon, Ph.D., 503 W. 25th St., Austin, Tex., Asst. Director, Maternal and Child Health, State Dept. of Health
- Dorothy M. LaSalle, M.A., U. S. Office of Education, Federal Security Agency, Washington, D. C., Specialist in Physical Fitness
- Donald I. Minnegan, M.A., 1111 Lexington Bldg., Baltimore, Md., Acting State Director of Physical Education and Recreation, State Dept. of Education
- Regine K. Stix, M.D., 120 Riverside Drive, New York 24, N. Y., Supervising School Physician, Vocational High School Service, N. Y. City Health Dept.
- Marguerite Vollmer, M.A., 114 East 52nd St., New York, N. Y., Health Teacher, Oceanside High School

Epidemiology Section

- M. Ferrer Cartaya, M.D., Maceo No. 22 Caimito de Guayabal, Havana, Cuba, Jefe Local de Salubridad de Caimito de Guayabal, Ministerio de Salubridad y A. Social
- John J. Hanlon, M.D., M.P.H., School of Public Health, Univ. of N. C., Chapel Hill,

Dental Health Section

- Henry T. Ellison, D.D.S., M.S.P.H., 240 W. 102nd St., New York, N. Y., Supervising Dentist, Children's Aid Society
- Hester K. Nicoles, R.N., 211 Richards St., Joliet, Ill., Supervisor of Health Service, Joliet High School & Junior College

Leo Remes, D.D.S., 4125 Bell Ave., Bayside,
L. I., N. Y., Health Officer in Training,
N. Y. City Health Dept.

Unaffiliated

John C. Bugher, M.D., Rockefeller Founda-
tion, 49 W. 49th St., New York, N. Y.,
Staff Member

Lawrence K. Frank, 72 Perry St., New York

14, N. Y., Executive Secretary, Mayor's
Committee on Medical Care

Charles L. Newberry, M.D., 119 Walsh Rd.,
Lansdowne, Pa., Surgeon (R), U. S. Public
Health Service

Walter G. Nord, 144 Spring St., Amherst,
Ohio, Member, Lorain County Health
Board

Herbert L. White, 108 Broadway, Hornell,
N. Y., City Sanitarian, City Dept. of
Health

RESOLUTIONS

The following Resolutions were unanimously adopted by the Association at the Seventy-second Annual Meeting in New York, N. Y., October 12-14, 1943.

1. APPRECIATION

TO DR. STEBBINS AND THE LOCAL COMMITTEE

RESOLVED that the American Public Health Association express its grateful appreciation to the New York Local Committee and to the agencies and individuals represented thereon.

RESOLVED that the thanks of the officers and members be extended to Dr. E. L. Stebbins, Health Commissioner of New York and General Chairman of the Local Committee, and to the chairmen and members of the several subcommittees whose services have contributed so markedly to the success of the Wartime Conference and Seventy-second Annual Business Meeting.

TO THE NEW YORK CITY AND NEW YORK STATE HEALTH DEPARTMENTS AND HEALTH COMMISSIONERS OF NEW JERSEY AND CONNECTICUT

RESOLVED that the American Public Health Association express its thanks to the New York City Health Department and the New York State Health Department, to the Commissioner of Health of New Jersey, and to the Commissioner of Health of Connecticut for their valuable assistance in the conduct of this Annual Meeting.

TO THE NEW YORK CONVENTION AND VISITORS BUREAU AND TO THE HOTEL PENNSYLVANIA

RESOLVED that the American Public Health Association express its thanks to the New York Convention and Visitors Bureau and to the Hotel Pennsylvania for their coöperation in making such excellent facilities available for the Seventy-second Annual Business Meeting.

TO COÖPERATING AGENCIES

RESOLVED that the American Public Health Association express its grateful appreciation to the Public Health Association of New York City, to the National Health Council agencies, to the National Health Library, and to the National Publicity Council for their excellent assistance in the conduct of this meeting.

TO THE PRESS AND RADIO

RESOLVED that the American Public Health Association acknowledge its indebtedness to the press and radio, national, state, and local for its service in connection with the Wartime Conference.

TO EXHIBITORS

RESOLVED that the American Public Health Association express its grateful appreciation to its friends and coöperators who have presented at its Wartime Conference and 72nd Annual Business Meeting the excellent exhibits which are of such great interest and value.

2. IN MEMORIAM

RESOLVED that it is with a sense of irreparable loss that the American Public Health Association records, since its last Annual Meeting, the death of 48 Fellows and members, the names of whom constitute a part of this resolution.

J. S. Abbott, Washington, D. C., Elected Member 1925, Fellow 1929.

John W. Alvord, Chicago, Ill., Elected Member 1899, Charter Fellow 1922.

Theodore V. Bauer, M.D., Buffalo, N. Y., Elected Member 1924.

Richard P. Borden, Fall River, Mass., Elected Member 1920.

Clarence N. Boynton, Phoenix, Ariz., Elected Member 1916, Fellow 1935.

Richard M. Bradley, Boston, Mass., Elected Member 1920.
 James M. Brannon, Ph.D., Urbana, Ill., Elected Member 1929.
 Alice G. Bryant, M.D., Boston, Mass., Elected Member 1921, Fellow 1923.
 E. G. Buckland, New Haven, Conn., Elected Member 1920.
 Loneta M. Campbell, R. N., Cincinnati, Ohio, Elected Member 1934, Fellow 1938.
 Thomas E. Camper, M.D., Corunna, Mich., Elected Member 1936.
 Horton R. Casparis, M.D., Nashville, Tenn., Elected Member 1941.
 D. N. Cone, M.D., Jasper, Fla., Elected Member 1937.
 C. B. Crittenden, M.D., Louisville, Ky., Charter Fellow 1923.
 Donald E. Cummings, Denver, Colo., Elected Member 1935, Fellow 1941.
 Lt. Col. Joseph M. Curry, V.C., Keesler Field, Miss., Elected Member 1937, Fellow 1942.
 Courtenay Dinwiddie, Irvington-on-the-Hudson, N. Y., Elected Member 1916, Charter Fellow 1922.
 Warren F. Draper, Jr., M.D., Paris, Tex., Elected Member 1942.
 John W. Elder, M.D., Albuquerque, N. M., Elected Member 1940.
 A. Grant Fleming, M.D., D.P.H., Montreal, Can., Elected Member 1920, Fellow 1939.
 Hubert Flurry, M.D., Booneville, Miss., Elected Member 1942.
 Harry Goldman, M.D., M.P.H., Boston, Mass., Elected Member 1924.
 S. S. Goldwater, M.D., New York, N. Y., Elected Member 1902, Charter Fellow 1922.
 J. K. Gore, Orange, N. J., Elected Member 1921.
 Hazel M. Hatfield, M.D., New York, N. Y., Elected Member 1920.
 Marvin F. Haygood, M.D., West Point, Ga., Elected Member 1918, Fellow 1938.
 Charles R. Hoover, Ph.D., Middletown, Conn., Elected Member 1930.
 James E. Ives, Ph.D., Washington, D. C., Elected Member 1932.
 Martin H. Knutsen, M.S., State College, Pa., Elected Member 1919.
 A. T. McCormack, M.D., Louisville, Ky., Elected Member 1919, Charter Fellow 1923.
 Harry B. Meller, Pittsburgh, Pa., Elected Member 1930.
 Howard B. Mettel, M.D., St. Louis, Mo., Elected Member 1936, Fellow 1939.
 Sir Arthur Newsholme, Worthing, Sussex, England, Honorary Fellow 1931.
 Theodore F. Pappe, Buffalo, N. Y., Elected Member 1940.
 Dr. Mosby G. Perrow, Lynchburg, Va.,

Elected Member 1908, Charter Fellow 1922.
 Ruth Ogden Pierson, East Orange, N. J., Elected Member 1917.
 Blanche Potter, New York, N. Y., Elected Member 1923.
 Frank C. Rainier, Whittier, Calif., Elected Member 1940.
 Paul D. Robason, M.D., McKinney, Tex., Elected Member 1942.
 William J. Ryan, M.D., Pomona, N. Y., Elected Member 1934.
 Fred C. Spalding, Valley City, N. D., Elected Member 1939.
 J. F. X. Stack, M. D., Hoboken, N. J., Elected Member 1923.
 William Thau, M.D., Boston, Mass., Elected Member 1937.
 Arthur H. Thomas, Philadelphia, Pa., Elected Member 1913.
 Leslie T. Webster, M.D., New York, N. Y., Elected Member 1935, Fellow 1940.
 Robert S. Weston, Boston, Mass., Elected Member 1896, Charter Fellow 1922.
 LeRoy A. Wilkes, M.D., Trenton, N. J., Elected Member 1919.
 Frank A. Williams, M.D., Lake Providence, La., Elected Member 1936.

3. DISTRIBUTION OF PUBLIC HEALTH NURSING PERSONNEL

WHEREAS, the nursing division of the Procurement and Assignment Service of the War Manpower Commission has developed principles and objectives which seem desirable for the proper utilization of public health nursing personnel, and

WHEREAS, the success of the application of these principles depends upon the understanding and support of health agencies and of the public, therefore be it

RESOLVED that the American Public Health Association recommend that health departments and public health nursing agencies take an active part in assisting local nursing committees of Procurement and Assignment to obtain equitable distribution of nursing personnel in ways best suited to local situations and to gain public understanding and support of this distribution.

4. PERSONNEL POLICY DURING THE EMERGENCY

WHEREAS, it is essential that practical action be taken by state and local health departments to meet the personnel shortage during the war emergency, and

WHEREAS, the American Public Health Association Committee on Professional Education has prepared a statement on this problem

which was published in Volume 33, No. 7, July, 1943 issue of the *American Journal of Public Health* which suggests a solution of the problem without jeopardizing future qualifications of permanent public health personnel, therefore be it

RESOLVED that the American Public Health Association recommend this published statement as a guide to personnel policy during the war emergency.

5. LABORATORY SUPPLIES AND EQUIPMENT

WHEREAS, state and all other public health laboratories are encountering increasingly serious difficulties in the procurement of supplies and equipment essential to their effective functioning, without which the provision of adequate safeguards for the public health is impossible; and recognizing that the current health hazards are increasing because of the intensity and extent of the war effort, therefore be it

RESOLVED that the American Public Health Association request the proper authority to designate The United States Public Health Service as a claimant agency, subject to the organization's willingness so to serve, with due recognition and authority under War Production Board regulations, to insure that supplies and equipment essential for laboratory purposes be made available to the extent necessary to overcome these difficulties.

6. DIVISION OF INDUSTRIAL HYGIENE IN THE DEPARTMENT OF LABOR

WHEREAS, it appears that there has been introduced into Congress a Bill (H.R. 2800) which proposes an extension of the activi-

ties of the Department of Labor by creating therein a division of industrial hygiene, and WHEREAS, it further appears that the creation of such a division of industrial hygiene in the Department of Labor would duplicate the activities already provided for in the U. S. Public Health Service for this purpose and furthermore would tend to interfere in similar services carried out in the various states and the health departments now therefore be it

RESOLVED that the American Public Health Association hereby declare itself as opposed to such legislation, and be it further

RESOLVED that a copy of this resolution be forwarded to the committees of Congress that have this matter before them.

7. PAN AMERICAN HEALTH DAY

WHEREAS, the second of December has been declared Pan American Health Day by official proclamation of the Governments of all the American Republics, and

WHEREAS, this Inter-American celebration has assumed increasing importance in the different countries of the Western Hemisphere, therefore, be it

RESOLVED that the Executive Board urges all members of the American Public Health Association to lend their fullest coöperation in order that this day may be endowed with even greater significance from the standpoint of Hemispheric solidarity and the promotion of health, and especially urge such members as occupy responsible positions either in health departments or scientific institutions to place themselves in touch with the Pan American Sanitary Bureau so that they may coöperate in an effective and practical manner in this enterprise.

DECEASED MEMBERS

Courtenay Dinwiddie, New York, N. Y., elected Member 1916, Charter Fellow 1922, Maternal and Child Health Section.

J. Leake, M.D., Portsmouth, Va., Elected Member 1933, Health Officers Section.

Thomas A. Storey, M.D. Stanford University,

Calif., Elected Member 1912, Charter Fellow 1922, Life Member 1932, Maternal and Child Health Section.

Hassow Von Wedel, M.D., New Rochelle, N. Y., Elected Member 1915, Charter fellow 1922, Laboratory Section.

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.

POSITIONS AVAILABLE

Physician: public health pediatrics. To assist director of maternal and child health in large California county health department. Major duties, conducting of infant and preschool health conferences and school examinations. Positioning salary \$350 and travel. California license required. Training and experience in pediatrics or public health or both. Immediately available. Address William C. Buss, M.D., Kern County Health Department, Bakersfield, Calif.

Wanted: A physician trained in tuberculosis to assume administrative control of the Bureau of Tuberculosis in an eastern city of 200,000 population. Salary \$3,900-\$4,500 plus cost of living adjustment. Address Box B, Employment Service, A.P.H.A.

Sanitarian wanted: Preferably with Bachelor's degree or engineering degree, plus public health experience or training. Must have own car. Applicant with lower qualifications will be offered an opportunity to take a short, free indoctrination course. Salary \$1,920 per year with travel allowance of \$50 per month, if qualified. Apply Dist. Dept. of Health, No. 6, Central Office, Newberry, Mich., Dr. Franklin.

Wanted: Pediatrician to supervise medical care of children at cerebral palsy center being established by private institution in cooperation with Illinois Division of Services for Crippled Children. Salary commensurate with experience and training. For further information write Lawrence J. Linck, Director, Division of Services for Crippled Children, 1105 So. Sixth St., Springfield, Ill.

The Department of Health, New Jersey, whose industrial health activities have expanded rapidly during the present war, has announced its need for two full-time industrial hygiene physicians for its Industrial Hygiene Service. As one of the leading states in the production of war materials, New Jersey offers unusual

opportunities for gaining experience in occupational disease control besides giving the physician a chance to make a valuable contribution to the war effort. The principal duties of the selected physicians will be consultations in regard to the following: control of occupational diseases; industrial toxicological problems; evaluation of adequacy of plant medical services; promotion of measures which will reduce absenteeism from non-occupational causes; and conduct of industrial health education activities. Physicians interested in these positions should write to the Department of Health, Trenton, N. J.

Merit System for Personnel Administration in Delaware will set examinations for 3 positions in the Delaware State Board of Health shortly. The positions open for examination, together with the beginning salaries, are: Deputy State (County) Health Officer (\$3,800), Pediatrician (\$3,600), and Medical Social Consultant (\$2,400).

These examinations will be unannounced, but successful candidates will be expected to appear in Delaware for an oral interview which will be a weighted part of the examination. Appointments may be expected soon after the examinations are conducted.

Information and specifications as prepared for each position may be secured by communication with the Merit System Supervisor, P. O. Box 1911, Wilmington, Del., and application for examination must be made on the official form.

The Milwaukee Health Department is interested in obtaining an instructor in hospital nursing to conduct a student educational program in its communicable disease hospital. Salary offered begins at \$125 per month with maintenance, and increases of \$5 per month each year until \$135 has been reached. To this basic salary there has been added a cost of living bonus of \$30.64 per month, making the total beginning salary \$155.64 plus

maintenance. Apply to Dr. G. F. Burgardt, Deputy Commissioner of Health, Milwaukee, Wis.

Wanted: Public health physicians in Texas. George W. Cox, M.D., State Health Officer, Austin, Tex.

Wanted: Public health statistician for large California County Health Department. College degree with training in statistics. Salary \$200. Position open. Address William C. Buss, M.D., Kern County Health Dept., Bakersfield, Calif.

Hawaiian Territorial Board of Health seeks trained engineer to supervise rodent plague control program. Salary range from \$331.67 to \$398.33 per month subject to retirement deductions plus bonus. Position under Territorial civil service system with classification of P-4. For further details address A.P.H.A. Employment Service.

Wanted: Physical therapist by crippled Children's Division. Should be graduate of a school of nursing or of college, with a major in physical education or science; have completed a course in physical therapy; should have had experience in physical therapy, preferably with children. Write for application blank to Merit System Council, 416 Henry Building, 309 S.W. 4th Ave., Portland 4, Oregon.

Psychiatric case worker desired for mental hygiene clinic, Department of Health, Peoria, Ill.

Senior Sanitarian, Alaska Health Department. Minimum requirements 2 years college, 6 months public health course, 2 years' experience. Two additional years' experience acceptable instead of each year college. Monthly salary \$235-\$265. Mary B. Pool, Alaska Merit System, Juneau.

FOR OTHER POSITIONS AVAILABLE WRITE EMPLOYMENT SERVICE, AMERICAN PUBLIC HEALTH ASSOCIATION, 1790 BROADWAY, NEW YORK 19, N. Y.

In view of the current active demand for trained and experienced persons in public health, it is suggested that prospective employers communicate directly with the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y., for up-to-date lists of applicants.

POSITIONS WANTED

ADMINISTRATIVE

Physician, age 37, M.D. Iowa, Dr.P.H. Harvard, specializing in tuberculosis, seeks position as medical director of a sanatorium or a state bureau of tuberculosis. Exempt from military service. A-476

Physician, M.D. Yale, with private practice industrial medicine. Age 39 and draft exempt. Seeks opportunity as public health physician. A-405

Woman physician, well prepared in pediatrics. M.S.P.H. DeLamar Institute, Columbia University 1943, seeks employment in field of maternal and child health, preferably administrative in pediatrics. Excellent references. A-507

Physician, M.D. University of Arkansas, M.P.H. Harvard, experienced as county health officer. Age 35. Will consider position as county or city health officer or director of a bureau. A-506

Physician, age 28, M.D. Yale, trained in pediatrics, now county health officer of southern state, seeks administrative position in northeastern United States. A-509

Woman physician, age 35, M.D. University of Minnesota, 2 years' experience as county health officer, seeks clinical or administrative position, preferably South. A-510

HEALTH EDUCATION

Woman with background of health education and public health nursing, experienced as teacher, supervisor, and writer, seeks teaching position of responsibility. H-507

LABORATORY

Research bacteriologist. Unusually trained and experienced woman bacteriologist and serologist now occupying responsible position in state laboratory seeks research work of permanent character. L-468

Water chemist, bacteriologist, M.S. degree in Sanitary Chemistry. Age 36, draft exempt. Eight years' experience in state laboratory working on water, milk and sewage. Prefers Midwest or Pacific Northwest location. L-469

NEWS FROM THE FIELD

RESOLUTIONS ADOPTED BY THE LATIN AMERICAN DELEGATES TO THE INTER-AMERICAN CONFERENCE ON HEALTH EDUCATION HELD AT THE TIME OF THE 72ND ANNUAL MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION IN NEW YORK CITY, OCTOBER 11, 1943.

I

The delegates attending the First Conference on Health Education hereby express their gratitude to the Pan American Sanitary Bureau in Washington and to the Institute of Inter-American Affairs for having sponsored this Meeting, which will mark an important step in the cooperative program for the improvement of health conditions in the Americas. The Delegates also wish to express their gratitude to the American Public Health Association for having included this Conference in its 72nd Annual Meeting.

II

The Conference on Health Education also passed a resolution commending all those persons in the countries of America who are working to create a general health consciousness among the inhabitants of the Western Hemisphere, urging them to coördinate their work for more effective results.

III

The Conference on Health Education, having been informed of the effective work being done by the Governments of the American countries in behalf of health education, adopted a special resolution to recommend that this work be based upon the modern technical methods which experience has demonstrated to be useful in this activity.

IV

The Conference on Health Education expressly declares that health education should be made an integral part of public education and that, consequently, the teachers should be properly instructed so that they can perform these duties. This instruction should be given in the Institutes and Health Schools already established, or in other appropriate institutions. It is also recommended that this matter be discussed at the forthcoming meeting of the Health Teachers of America to be held in Ann Arbor. The papers contributed by several delegates to the Conference are referred to said meeting of the Health Teachers of America for deliberation.

V

Since health education is fundamentally necessary for the effective progress of hygienic practices among the people, the Conference on Health Education recommends that an Inter-American Conference on this subject be held in one of the Latin American capitals; and in consequence, it requests the Pan American Sanitary Bureau and the Institute of Inter-American Affairs, in pursuance of their customary policy and with the assistance of the respective governments, to organize such a conference. The Conference on Health Education believes that in this manner the progress made in social security, and the affirmation of the principles set forth in the Atlantic Charter will be secured. Therefore, as the last act of its deliberations, it urges that this conference be organized and held.

NEW COURSE IN HEALTH EDUCATION FOR LATIN AMERICANS

Arrangements have been completed between the University of California and the Institute of Inter-American Affairs to establish a special course in Health Education to meet the particular requirements of students from Latin America. This course will begin on March 1, 1944. Students who require English instruction will be urged to come to this country not later than December 10, 1943, so that they may have time to secure the necessary instruction. The course in English will be specially planned to deal with the vocabulary which will be used in the later course in Health Education and will serve also as an orientation course. During the preliminary training period, it is expected that selected students may have an opportunity to attend other courses in the University which will assist them in later studies in Health Education.

The Health Education course will be given in the newly established School of Public Health, which is under the direction of Walter H. Brown, M.D., who has had a long experience in the United

States and abroad in public health administration and health education. It will include training in the principles of public health and hygiene, and in the principles of education, particularly as these apply to conditions in South and Central American countries and the health work of the C.I.A.A. in those areas. Arrangements are being made to appoint one or more experienced public health administrators from Latin America to serve temporarily on the faculty so that their experience will be available to assure that instruction is given in accordance with the needs arising out of the particular conditions in various countries.

All applicants must give evidence of their intention to undertake service in public health or in school health work in Latin America after completion of the course.

Classroom instruction will be given on the campus at Berkeley, Calif., after which there will be supervised field training. While in Berkeley, the students will be housed by the International House organization, which has had a long experience in assisting students from Latin America in making their stay in this country pleasant and profitable. In order to assure maximum value of instructional facilities, the class for 1944 will be limited to thirty students.

Applicants for study grants from the Institute of Inter-American Affairs should be between the ages of 30 and 45 years, although consideration will be given to applications from those outside this age group in exceptional circumstances. Individuals with prior training or experience in public health work, school health education, and related fields will be given preference in selection, but others may also apply. Applications will be received from both men and women. Candidates need not be physicians.

Students who are selected for this

training by the Institute of Inter-American Affairs will receive monthly stipends adequate to meet their living costs and will be furnished with tuition and transportation from their place of residence to the University of California, and return. Students should not bring their families with them. No funds or accommodations are available for this purpose.

All applications will be made through Chiefs of Party of the Coordinator's Office in each republic in accordance with regulations governing the Institute Training Program, or through the Pan American Sanitary Bureau, Washington, D. C.

TROPICAL MEDICINE AT COLUMBIA-
PRESBYTERIAN MEDICAL CENTER,
NEW YORK

Dr. Harold W. Brown, Dean of the School of Public Health of the University of North Carolina, has resigned, effective January 1, to assume the Professorship of Parasitology at Columbia University. This appointment marks the beginning of a new program in Tropical Medicine at the Columbia-Presbyterian Medical Center. Dr. Brown is the first member of a faculty for training and research in tropical diseases, which will function under the immediate direction of the DeLamar Institute of Public Health, a division of the Medical School. This program has been made possible by a grant from the Josiah Macy, Jr. Foundation.

U. S. AND AMERICAN REPUBLICS
EXCHANGE MEDICAL KNOWLEDGE

The Americas are exchanging medical knowledge as part of a great inter-American health and sanitation program, now under way in seventeen of the other American republics.

In this continental effort to control and reduce the ravages of malaria, tuberculosis, yaws, and other diseases, the United States is contributing technical

and financial assistance through the Institute of Inter-American Affairs, an agency of the Office of Inter-American Affairs.

Many doctors, sanitation engineers and other specialists of Latin America are coming to the United States to study in leading medical schools, for observation and training in public health activities and in special fields of health work.

In turn, United States doctors are finding new opportunities for first-hand study and practical experience in the projects evolving out of the inter-American program, particularly in the campaign against malaria and other tropical diseases.

More than one hundred doctors from Latin America have come to the United States for additional training. In the reversal of this exchange, some thirty United States doctors already have completed training in Central America, where extensive work is being carried on for control of malaria.

Dr. Eugene P. Campbell, of the health and sanitation division of the Institute of Inter-American Affairs, Washington, reports that medical men from the United States are enthusiastic about the training they are receiving in the republics to the south. Dr. Campbell is director of the United States missions assisting Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua in health and sanitation programs.

The training program was established by the Association of American Medical Colleges, with the financial support of the Markel Foundation in New York.

PAN AMERICAN DEMOGRAPHIC COMMITTEE

The first Pan American Demographic Congress which met during October in Mexico City resulted in the formation of a permanent Pan American Demographic Committee to correlate statistics and to study problems connected with immigration and the movement of popu-

lations, it was reported in the *New York Times*. The underlying purpose of the Congress was said to have been the formulation of a joint Latin American immigration policy to cope with the pressure of organized groups that are expected to ask the Western Hemisphere countries to open their doors to European immigrants after the war.

Lowell J. Reed, Ph.D., Dean of the School of Hygiene and Public Health of Johns Hopkins University, Baltimore, and Earl G. Harrison, United States Commissioner of Immigration and Naturalization, represented the United States. It was said that the results of the Congress were satisfactory and that they enabled the delegates of the 21 American republics to exchange information and experience.

UNIVERSITY OF BIRMINGHAM, ENGLAND, SEEKS PROFESSOR OF SOCIAL MEDICINE

Dr. George Auden, Birmingham, England, writing recently to Dr. Haven Emerson, describes a grant which the Nuffield Trust has made for a Chair of Social Medicine at the University of Birmingham, the salary at £1,500 may be raised to £2,000.

"I believe strongly that it is probable that a suitable holder of this important chair is more likely to be found on your side of the Atlantic. We have nothing to compare with the Johns Hopkins School of Hygiene in depth and width of training, for in England the teaching of hygiene in our medical schools has been mainly directed towards the Diploma in Public Health—a sine qua non for a public health appointment, and the training of our medical students has centered round the out-patient and in-patient departments of hospitals with little or no reference to the social factors of environment, temperament, etc., in relation to disease. The advertisements are now being published in our medical papers and applications need not be submitted (with three references) before the 1st of March, 1944. I hope you will let this be known amongst the medical schools. It might tempt some pioneer enthusiast. The chair offers such splendid opportunities and should be held by a man

of real originality and distinction if it is to be a real success. Unfortunately our clinical colleagues find it hard to see what is meant by 'social medicine.' They will tend to look for a clinician rather than for a bio-sociologist. Particulars can be obtained from the Secretary of the University, C. G. Burton, Edmund Street, Birmingham 3."

DR. SHOPE AWARDED JOHN SCOTT MEDAL

The award of the John Scott Medal to Dr. Richard E. Shope of the staff of the Rockefeller Institute for Medical Research, New York, N. Y., has been announced in recognition "of his discovery of the complex etiology of swine influenza."

RHEUMATIC FEVER REPORTABLE IN MARYLAND

By an action of the Maryland State Board of Health on September 23, rheumatic fever and rheumatic heart disease were made reportable, according to an announcement released by Robert H. Riley, M.D., the Director of the State Department of Health.

CHILDREN'S BUREAU CONFERENCE ON RHEUMATIC FEVER

A conference called by the Children's Bureau met in Washington early in October to discuss the problems related to rheumatic fever. About 100 persons attended who were told that special services for children with rheumatic fever are now financed through 13 official state agencies, with funds appropriated by the Children's Bureau for this purpose. More than 3,600 children had visited clinics for this purpose during the last year.

According to the press, Dr. Martha M. Eliot, Associate Chief of the Children's Bureau, spoke favorably of the use of the sulfonamide drugs in protecting children from recurrent attacks of rheumatic fever and prolonging their lives. According to Brigadier General Hugh J. Morgan, Consultant in Medicine, Office of the Surgeon General, U. S.

Army, only one-third of the service men who develop or have been discovered to have had rheumatic fever can be salvaged to the point where they can carry on effectively in the Army. He urged civilian health authorities "to follow the lead of the Army and Navy in steps to combat the disease."

TENNESSEE DIVISION OF VITAL STATISTICS COÖPERATES WITH LOCAL RATIONING BOARDS

A coöperative program for the exchange of certain information concerning births and deaths has been developed between the Tennessee Office of Price Administration and the Tennessee Department of Public Health. This program consists of furnishing to local War Price and Rationing Boards lists of births and deaths registered with local registrars of vital statistics. In turn, the local War Price and Rationing Boards furnish the local registrars with lists of persons whose ration books have been returned on account of death.

According to Don C. Peterson, M.D., State Registrar of Vital Statistics, this plan accomplishes the following purposes:

1. It prevents the fraudulent securing of ration books for infants.
2. Prevents the issuance of duplicate ration books for infants.
3. Assists local War Price and Rationing Boards in securing the surrender of ration books of persons who have died.
4. Promotes a more prompt and complete registration of all births and deaths in the State of Tennessee.
5. The local War Price and Rationing Boards receive through local registrars of vital statistics an official confirmation of births and deaths reported in their respective jurisdictions at regular intervals.

This plan has been in operation in Tennessee with satisfactory results since January 1, 1943. Apparently the success of the plan is due largely to the fact that all work is carried out at the local level with a minimum delay to the

public. Parents may secure ration books for the new baby in a matter of an hour or so, if desired, as all the necessary persons are in the immediate vicinity and are readily available. There are no fees involved and no additional requirements imposed on the public. Prior to the inauguration of this program, the local War Price and Rationing Boards had no source of information on deaths other than newspaper items or hearsay evidence. Consequently, a very small proportion of ration books of deceased persons were being surrendered. The program has very materially altered this situation and it is the impression that these books are now being surrendered promptly on receipt of a notice from the Board. The improvement in birth registration has been most marked. At the present time approximately 25 per cent more birth certificates are being filed than for the same period in previous years. Not all of this increase can be attributed to an increase in the actual number of births occurring in the state. In addition to improvement in birth registration, more complete information is becoming available concerning unreported deaths. This information is being used by the local registrars in improving death registration.

LABORATORY TRAINING FELLOWSHIPS

The W. K. Kellogg Foundation has granted ten fellowships to the Maryland State Department of Health for the training of qualified students in clinical and public health laboratory work, according to R. H. Riley, M.D., Director, Maryland State Department of Health. Training in clinical laboratory work will be at the Union Memorial Hospital School of Medical Technology or at the University of Maryland Hospital, both located in Baltimore. Training in public health laboratory methods will take place in the central laboratories of the Bureau of Bacteriology of

the State Department of Health. The entire course will cover a full 12 months of training. Only students who have completed their basic training at an accredited college or university, or those who will be eligible for a bachelor's degree upon satisfactory completion of this course, can be granted fellowships.

Fellows who satisfactorily complete this training course will be qualified in both public health and clinical laboratory work. In addition to their bachelor's degree, they will have had a year's experience along with their special training, so that they can meet the requirements for Junior Assistant or Senior Assistant Bacteriologists (or serologists) as recently prescribed by the American Public Health Association. They will also have absolved the qualifications for medical technologists as established by the American Society of Clinical Pathologists. Graduates will be qualified, therefore, to accept positions in public health or clinical laboratories and should be especially qualified for positions in medico-public health laboratories such as are developing in Maryland, where both types of training are essential.

NEW SCHOOL HEALTH SERVICE DAILY-MONTHLY REPORT

The National Organization for Public Health Nursing, New York, N. Y., has released a new School Health Service Daily-Monthly Report Form after a trial period of four years. The report may be used by the nurse doing school work as a part of the generalized program, as well as by the specialized school nurse, and is designed to show both quality and scope of service.

UTAH PUBLIC HEALTH ASSOCIATION

The Utah Public Health Association met in Salt Lake City September 25 under the Presidency of William M. McKay, M.D., State Health Commissioner. The program items included

Industrial Hygiene of the Army, Army Borne Tropical Diseases, the problems of maternal morbidity and studies in poliomyelitis, among others.

New officers elected were as follows:

President for the ensuing year: H. L. Marshall, M.D.

President-elect, E. H. Bramhall.

Vice President, D. Keith Barnes, M.D.

Secretary, Elmer B. Quist.

Treasurer, Dorothy Lowman.

Directors, Verna Peterson and Howard M. Hurst.

Meeting jointly with the Utah Public Health Association were the Utah Public Health Nurses Association and the Utah Sanitarians Association.

SOUTH DAKOTA PUBLIC HEALTH ASSOCIATION

The South Dakota Public Health Association met in Huron on September 21 under the Presidency of G. L. Hickman, M.D. Gilbert Cottam, M.D., is the Secretary-Treasurer and Superintendent of the State Board of Health.

CHANGES IN OCD SANITARY ENGINEERING STAFF

George Baehr, M.D., Chief Medical Officer of the Office of Civilian Defense, Washington, D. C., has announced the following changes in the sanitary engineering staff of the Medical Division, Office of Civilian Defense.

LINDON J. MURPHY, who has been Director of Engineering Extension Service, Iowa State College, Ames, Ia., has been commissioned in the U. S. Public Health Service Reserve and assigned as Regional Sanitary Engineer in the 7th Region in Omaha, Neb.

WILLIAM T. INGRAM, who has been Assistant Regional Sanitary Engineer with headquarters in San Francisco, has been promoted to the position of Regional Sanitary Engineer, succeeding Gerald E. Arnold who has been assigned to the San Francisco district of the War Production Board. Mr. Ingram formerly was sanitary engineer of the San Joaquin

local health district, Stockton Calif. He received the M.P.H. degree from Johns Hopkins in 1942.

JOHN C. LUTHIN, recently on the staff of the Kaiser Company, Richmond, Calif., has been commissioned in the U. S. Public Health Service Reserve and assigned to succeed Mr. Ingram as Assistant Regional Sanitary Engineer in San Francisco.

HUGH R. MCCALL, Regional Sanitary Engineer with headquarters in Baltimore, has been transferred to the Central Office of the OCD in Washington as Assistant Chief Sanitary Engineer in the Medical Division.

Succeeding Mr. McCall, WARREN H. BOOKER, Director of the Division of Sanitary Engineering of the North Carolina State Board of Health for the last 12 years, has been commissioned in the Public Health Service Reserve and assigned to Baltimore.

AMOS J. ALTER, a member of the Central Office staff of the OCD for the past year, has been transferred to the office in Dallas, Tex., as Assistant Regional Sanitary Engineer.

LATIN AMERICAN VISITORS AT THE 72ND ANNUAL MEETING, A.P.H.A.

More than 70 visitors from Latin American countries attended the recent Annual Meeting of the American Public Health Association, many of them guests of the Pan American Sanitary Bureau and the Office of the Coördinator of Inter-American Affairs. Some currently are students in American universities. Included in the list were the following:

ARGENTINA: Dr. Luis M. Barreiro
Dr. Alfredo Sordelli
Dr. Alberto Zwanck

BOLIVIA: Dr. Felix Veintemillas
Dr. Carlos Ferrufino

BRAZIL: Dr. Jesuino Albuquerque
Dr. Paulo do Amaral-Pamplona
Dr. Olympio da Fonseca
Mr. Jose Franco-Henriques
Dr. Vasco de Freitas-Barcellos

Dr. Abelardo Marinho
Dr. Egberto Prochat de Assis
Dr. Orlando Rodrigues da Costa
Mr. Marcello Teixeira-Brandao
Dr. G. H. de Paula Souza
Dr. Silvio de Sao Paulo

CHILE: Dr. Marcos Charnes
Dr. Mario Pizzi
Dr. Mario Prado-Lefort
Dr. Francisco Rojas
Dr. Hernan Romero

COLOMBIA: Mr. Prospero Ruiz

COSTA RICA: Dr. Fernando Guardia
Dr. Julio C. Ovaes
Mr. Rodrigo A. Vargas

CUBA: Dr. Moises Chediak
Dr. Pedro Machada
Mr. Raoul F. Cowley
Dr. Guillermo Lage y Fernandez
Dr. Felix Hurtado
Dr. Domingo F. Ramos
Dr. Alberto Recio

DOMINICAN REPUBLIC: Mr. Salvador Sanlley

ECUADOR: Mr. Cesar A. Ribadencira
Dr. J. A. Montalvan

EL SALVADOR: Dr. Alberto Aguilar-Rivas
Mr. Francisco Sequira
Mr. Roberto Vargas

GUATEMALA: Dr. Enrique Padilla
Mr. Julio Montano
Dr. Epaminondas Quintana

HONDURAS: Mr. Jorge E. Zepeda

MEXICO: Dr. Salvador Acosta-Baylon
Dr. Joaquin Alvarez de la Cadena
Dr. M. A. Alarcon
Dr. Alfonso Alarcon-O'Farrill
Dr. Amado Alarcon-O'Farrill
Dr. Luis de Alba-Luva
Dr. Luis Benitez-Soto
Dr. Salvador Gonzalez-Reynoso
Dr. Victor Ocampo-Alonzo
Dr. Federico Ortiz
Dr. Alfonso Segura-Albiter
Dr. Salvador Iturbide-Alvarez
Dr. Miguel E. Bustamante
Dr. Mario Quinones
Dr. Gustavo Uruchurtu

NICARAGUA: Dr. Carlos Amaya
Dr. Arturo Rodriguez R
Dr. Manuel A. Sanchez-Vigil

PANAMA: Dr. Benigno Angulo
Dr. A. Gonzalez-Revilla

PARAGUAY: Dr. Justino Almiron
Dr. Arturo Jose Buzarquis
Dr. Cesar Enrique Guggiari

Dr. Mariano Antonio Molas
Dr. Raul Pena

PERU: Dr. Gregorio B. Hernandez
Miss Elsa Paredes
Dr. Carlos E. Paz-Soldan

URUGUAY: Dr. Estenio Hormacche
Dr. Federico J. Salveraglio

VENEZUELA: Mr. Enrique Gonzales-Navas
Dr. A. Lares-Gabaldon
Dr. Francisco Scannone
Dr. A. L. Briceno-Rossi

Among this group are the members of the faculty of six schools of public health who are conferring with faculties of public health in the United States and Canada under a plan worked out by the University of Michigan and the W. K. Kellogg Foundation. It is expected that an arrangement for the interchange of students between countries in the American hemisphere will be developed. Members of this group include: Alberto Zwanck, Professor of Hygiene at the University of Buenos Aires; G. H. de Paula Souza, Professor of Public Health at the University of Sao Paulo, Brazil; Carlos Enrique Paz-Soldan, Professor of Hygiene at the University of San Marcos, Lima, Peru; Federico J. Salveraglio, Professor of Hygiene at the Medical School, Montevideo, Uruguay; Mario Prado-Lefort, Vice-director of the Institute of Bacteriology, Santiago, Chile; and Hernan Romero, Professor of Preventive Medicine and Public Health at the University of Chile, Santiago.

DR. GRAYSON RESIGNS AS ARKANSAS
STATE HEALTH OFFICER

William B. Grayson, M.D., who since 1933 has been State Health Officer in the Arkansas State Board of Health, has resigned, effective November 15, to enter private practice in Little Rock.

Dr. Grayson is succeeded by Thomas T. Ross, M.D., M.P.H., as Acting State Health Officer, who for seven years has been connected with the Arkansas State Board of Health as

Director of Maternal and Child Health. Dr. Ross is a native of Arkansas, a graduate in 1928 of the Tulane University School of Medicine, with a Master's degree in public health from Harvard School of Public Health in 1934.

WILLINK BECOMES BRITISH MINISTER OF HEALTH

The press on November 11 announced the appointment of Mr. H. U. Willink as Minister of Health of Great Britain, replacing Mr. Ernest Brown who now becomes Chancellor of the Duchy of Lancaster. According to the reports, Mr. Willink was in charge of the homeless in London during the blitz.

According to the *New York Times*, Mr. Willink will have a great deal to do with plans for rebuilding Britain, one-fifth of whose houses are said by the government to have been damaged since the start of the war.

In the same series of changes, Lord Woolton, who has been Minister of Food in Great Britain, has been appointed Britain's first Minister of Reconstruction, with a place of authority in the War Cabinet.

ILLINOIS UNDERTAKES SCHOOL HEALTH STUDY

Roland R. Cross, M.D., State Director of Public Health, Springfield, Ill., has announced plans for "the development of more effective, continuous, and coordinated public health programs in the schools." A joint committee has been set up representative of health and educational authorities, and a comprehensive study is planned of the existing assets and liabilities in the present school health programs throughout the state.

It was announced early in November that Clair E. Turner, Dr.P.H., Professor of Public Health at the Massachusetts Institute of Technology, Boston, would direct the study. The

project was linked with the movement in Illinois for the establishment of home-rule county health departments by the *Illinois Health Messenger*, as well as with the work of the State-wide Committee on Public Health which was organized following the survey of Illinois made under the auspices of the Committee on Administrative Practice of the A.P.H.A. by Dr. Carl E. Buck, Field Director.

SCHOLARSHIPS IN NURSE EDUCATION AVAILABLE

Lucile Petry, Director of the Division of Nurse Education of the U. S. Public Health Service, has announced that the increased enrollment of student nurses resulting from the recruitment program of the U. S. Cadet Nurse Corps has intensified the need for qualified instructors in the country's schools of nursing. All-expense scholarships in nurse education have been made available under the Bolton Act to encourage postgraduate training for nursing school graduates who show a particular aptitude for teaching. Schools of nursing have been urged to select members from their graduating classes who show promise as instructors. These graduates have been encouraged to apply to colleges and universities offering the desired type of postgraduate nurse education. A list of the colleges and universities offering postgraduate study and details of the study programs offered by each may be obtained from the Division of Nurse Education, U. S. Public Health Service, Washington, D. C.

WOMEN SANITARIANS IN TEXAS

The *Texas Journal of Public Health* for September-October reports that the Department of Public Health and Welfare of the City of Fort Worth has employed three women sanitarians for a temporary period. Their work, it is said, has resulted in improving sub-

stantially the sanitation of food handling establishments, particularly in the business district.

VISITORS FROM ECUADOR

Among recent visitors to this country were Dr. Leopoldo Izquieta Perez of Guayaquil, the Director of Health of Ecuador, and Dr. Cornelio Donoso, the Director of the Municipal Health Department of Quito, Ecuador.

CHANGES IN STAFF OF THE MEDICAL DIVISION, OFFICE OF CIVILIAN DEFENSE

DR. COURTNEY M. SMITH,* Assistant Regional Medical Officer in the Ninth Civilian Defense Region, recently stationed in Seattle, Wash., has been promoted to be Regional Medical Officer with headquarters in San Francisco. He succeeds Dr. FRED T. FOARD,* Senior Surgeon, U. S. Public Health Service, who has been made District Director, U. S. Public Health Service District No. 8, with headquarters in Denver. Prior to his appointment in the Medical Division of the Office of Civilian Defense, Dr. Smith was Assistant Health Commissioner of Alaska. He holds the rank of Surgeon in the U. S. Public Health Service Reserve.

DR. ARTHUR J. LOMAS, Deputy State Chief of Emergency Medical Service for Maryland, has been assigned as Regional Medical Officer for the Third Civilian Defense Region, which includes Maryland, Pennsylvania, and Virginia. Headquarters are in Baltimore. Dr. Lomas, who formerly practised medicine at Lutherville, Md., succeeds Dr. MARK V. ZIEGLER,† Senior Surgeon, U. S. Public Health Service, who has been assigned to the U. S. Maritime Commission. Dr. Lomas has the rank of Surgeon in the U. S. Public Health Service Reserve.

DR. BENJAMIN MILLER, Assistant Professor of Medicine, University of

Chicago School of Medicine, Chicago, was recently commissioned in the U. S. Public Health Service and assigned to the Washington staff of the Medical Division October 1, as Assistant Chief of the Scientific Research and Development Section.

LOUIS G. GOETZ, who came to the Medical Division as equipment officer in March, 1943, has entered military service. Before joining the Medical Division staff, Mr. Goetz was Assistant Comptroller at St. Luke's Hospital, New York, N. Y.

DR. WARD L. MOULD, Surgeon, USPHS, who has been assigned to the staff of the Medical Division, Office of Civilian Defense, since September, 1941, has returned to the U. S. Public Health Service. Dr. Mould served in various capacities in the Medical Division, most recently as medical chief of the industrial plant unit. He has been assigned temporarily as Assistant to the Director, U. S. Public Health District No. 1, with headquarters in New York, N. Y.

DR. VICTOR H. VOGEL, Surgeon, USPHS,† Administrative Officer of the Blood Plasma Unit of the Medical Division since its establishment early in 1942, has been transferred to the staff of the U. S. Public Health Service Hospital in Lexington, Ky.

PERSONALS

Central States

LEON H. FLANCHER, M.D., Epidemiologist, Division of Preventable Diseases (Tuberculosis Control), Minnesota Department of Health, has been appointed Director of the Division of Tuberculosis Control of the Iowa State Department of Health.

CHARLES F. MCKHANN, JR., M.D.,* has resigned from the faculty of the University of Michigan School of

* Fellow A.P.H.A.

† Member A.P.H.A.

Public Health, where he was Professor of Maternal and Child Health, to accept an appointment as assistant to the President of Parke, Davis & Company, Detroit.

LAURENCE T. ROGERS has been appointed Assistant Secretary of the Health Division of the Chicago Council of Social Agencies, Chicago, Ill.

CONRAD S. SOMMER, M.D., Chief Medical Officer in the Department of Public Welfare of Illinois, has been named Deputy Director of the Mental Hygiene Service, a newly created position. He is to supervise the twelve mental hospitals, the Neuropsychiatric Institute, the Division of Veteran Service and the Bureau of Home Economics and Nutrition.

HOLLAND THOMPSON, M.D., of Montgomery, Ala., Director of Tuberculosis Control for the State of Alabama, has been named Director of a new Tuberculosis Control Division, recently established by the Indiana State Board of Health to coördinate the work in the state against tuberculosis. At present all tuberculosis control activities of the State Board of Health are administered by the Communicable Disease Division.

Eastern States

MARY M. ATCHISON, M.D., M.P.H.,† formerly Director of the Divisions of Maternal and Child Health and Crippled Children's Services, New Hampshire State Board of Health, Concord, N. H., and recently Acting Deputy Secretary of the State Board, has been appointed Acting State Health Officer. Dr. Atchison fills the vacancy that occurred when ALFRED L. FRECHETTE, M.D., M.P.H.,† was granted a leave of absence as Secretary of the Board to engage in war

rehabilitation work under the auspices of the U. S. Public Health Service.

MURIEL F. BLISS, PH.D.,* Hartford, Conn., has resigned from the staff of the Connecticut State Department of Health to become Executive Secretary of the Hartford Tuberculosis and Public Health Society, effective November 1. Dr. Bliss, who received her degree in public health from Yale in 1943, was formerly connected with the Cancer Committee of Nassau County, Long Island, N. Y.

DR. A. JOSEPH HUGHES, of Camden, N. J., has been named by the State Board of Health as Medical Assistant to State Health Director J. LYNN MAHAFFEY, M.D.,† to develop a preventable disease program.

ALFRED E. KESSLER,† Director of the Buffalo Junior Chamber of Commerce, Buffalo, N. Y., has been appointed Chairman of the U. S. Junior Chamber Public Health Committee. Mr. Kessler is Health Education Secretary of the Buffalo and Erie County Tuberculosis Association.

WILLIAM E. MOSHER, JR., M.D.,† of Cortland, N. Y., has resigned as Health Commissioner of Cortland County to enter the armed services.

M. W. YALE, PH.D.,† formerly with the New York State Agricultural Experiment Station in Geneva, N. Y., is now Bacteriologist with the Shefford Cheese Company in Green Bay, Wis.

Southern States

RICHARD E. BANNER, M.D., of Kansas City, Mo., has been named head of the Health Unit in Johnson County, with headquarters at Warrensburg, Mo.

DOROTHY DAVIS BRYAN, of Nashville, Tenn., has been appointed to succeed the late HALE E. CULLOM, M.D., as Director of Sight Conservation and Prevention of Blindness for the State of Tennessee.

* Fellow A.P.H.A.

† Member A.P.H.A.

TILMAN E. DODD, M.D.,† of Bryan, Tex., has resigned as Health Officer of the Bryan-Brazos County Health Unit.

ROBERT H. HUTCHESON, M.D., C.P.H.,* of Nashville, Tenn., Assistant Commissioner and one time Superintendent of the Williamson County Health Unit, has been appointed State Commissioner of Public Health. He succeeds WILSON C. WILLIAMS, M.D., C.P.H.,* of Nashville, who accepted a commission as lieutenant colonel in the Medical Corps of the Army and who has been ordered to active duty.

ESTELLA LUCILLE JOHNSON MARSH, M.D., of Tallahassee, Fla., has been appointed Director of the Bureau of Maternal and Child Health of the Florida State Board of Health. Dr. Marsh has been serving as Chief Physician at the Florida State College for Women, Tallahassee. Since the resignation of ROBERT C. HOOD, M.D.,† of Jacksonville, to enter private practice in Arlington, Va., in 1942, the Bureau of Maternal and Child Health has been in charge of ERWIN F. HOFFMAN, M.S.P.H.,† Director of the Bureau of Epidemiology.

RITA MILLER has been appointed Consultant on Negro Nurse Education in the Division of Nurse Education, U. S. Public Health Service, Washington, D. C. Miss Miller is on loan from Dillard University, New Orleans, La., where she is Chairman of the Division of Nursing.

BENTON M. MONTGOMERY, M.D., has been named Director of the Clarendon County Health Department, succeeding EDWARD ALEX HEISE, M.D.,† who is now in charge of the Sumter County and City Health Departments. Dr. Montgomery is also Director of the Williamsburg County Health Department.

LUTHER A. RISER, M.D., of Sedgfield, N. C., has been named Director of

the Bureau of Vital Statistics of the South Carolina State Board of Health, to succeed MARTIN B. WOODWARD, M.D.,† of Aiken, who resigned to accept a similar position in West Virginia.

JOHN SCHREIBER, M.D.,† of San Augustine, Tex., has been named Health Officer of Nolan County.

ELMER J. TEAGARDEN, M.D., of Orlando, Fla., has been appointed Director of the Florida State Board of Health's Bureau of Tuberculosis. Dr. Teagarden has been serving as Superintendent of the Morgan County Tuberculosis Sanatorium, Flint (Decatur P. O.), Ala., and succeeds LYNNE E. BAKER, M.D.,† of Jacksonville, who resigned to enter private practice in Dayton, Ohio, last July.

RUSSELL M. WILDER, M.D., Chief of the Civilian Food Requirements Branch of the Food Distribution Administration, Washington, D. C., has resigned. Dr. Wilder will return to his work at the Mayo Clinic, Rochester, Minn., but will serve as medical adviser to the administration.

CAMILLA LOUISE WILLS,† of Towson, Md., was appointed to join the faculty of Lander College, Greenwood, S. C., to teach and be head of the Biology Department.

THOMAS V. WOODRING, M.D., Assistant Health Officer of Nashville, Tenn., for more than 15 years, has been appointed Director of Health of Nashville, a position recently created under a revision of the charter for the city. JOHN OVERTON, M.D.,† will continue as City Health Officer.

KENNETH J. WULFERT,† of Clayton, Mo., Assistant Public Health Engineer of the St. Louis County Health Department, has been commissioned a Second Lieutenant in the U. S. Army Sanitary Corps and has

* Fellow A.P.H.A.

† Member A.P.H.A.

American Journal of Public Health

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